

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference VDM-001-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/08757	International filing date (day/month/year) 08/09/2000	Priority date (day/month/year) 08/09/1999
International Patent Classification (IPC) or national classification and IPC H04L12/58		
Applicant VAN DALEN MANAGEMENT B.V. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 10 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☒ Certain defects in the international application
 - VIII ☒ Certain observations on the international application

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/08757

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-17 as originally filed

Claims, No.:

1-18 as originally filed

Drawings, sheets:

1/19-19/19 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/08757

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	2-12,14-18
	No:	Claims	1,13
Inventive step (IS)	Yes:	Claims	4,6
	No:	Claims	1-3,5-18
Industrial applicability (IA)	Yes:	Claims	1-18
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 The following documents are cited:

- D1: DE 197 13 240 A (ENDRESS HAUSER GMBH CO) 1 October 1998 (1998-10-01)
- D2: US-A-4 773 005 (SULLIVAN JAMES P) 20 September 1988 (1988-09-20)
- D3: STURM, PETER: 'Briefkasten einmal anders: Datenbanken für jedermann' FUNKSCHAU 24/1985, no. 24, November 1995 (1995-11), pages 60-62, XP002131553
- D4: US-A-5 805 298 (MAINEMER CARLOS I ET AL) 8 September 1998 (1998-09-08)
- D5: STEVENS ET AL: 'TCP/IP ILLUSTRATED, Vol. 1. THE PROTOCOLS' PROFESSIONAL COMPUTING SERIES, US, READING, MA: ADDISON WESLEY, 1994, pages 215-217, XP002100788 ISBN: 0-201-63346-9
- D6: US-A-5 974 453 (ANDERSEN DAVID B ET AL) 26 October 1999 (1999-10-26)

2 **Independent claim 1**

Due to the broad formulation of its subject-matter, independent claim 1 does not comply with the dispositions set out in Articles 33 (1) and (2) PCT regarding novelty of the invention.

Document D4, in fact, discloses, according to all the features of claim 1, a method for establishing e-mail communication between two users/devices who/which both have access to the Public Switched Telephone Network, without the need of being connected to the Internet (cf fig. 1, **users/devices are NOT connected to the Internet, they are connected to the PSTN**), comprising the steps of:

- A) establishing the data-link, and PPP connection between the sender and the receiver application (cf col. 3 lines 36-43); and
- B) transferring the e-mail message(s) to the receiver device over TCP/IP (cf col. 3 lines 43-47).

The wording of independent claim 1 is much too general, so that the subject matter of the claim is already known, in all essential aspects, from document D4; therefore the subject-matter of claim 1 is not new, Articles 33 (1) and (2) PCT.

3 Dependent claims 2, 3, 9, 10, 14, 15 and 18

Dependent claims 2, 3, 9, 10, 14, 15 and 18 do not appear to contain any additional features which in combination with the features of any claim to which they refer, involve an inventive step for the following reasons: the subject-matter of said claims is either directly derivable from prior art documents D1-D6 or represent minor design details generally known in the field of data communication networks.

The subject-matter of dependent claims 2, 3, 9, 10, 14, 15 and 18 therefore does not involve an inventive step so that these claims do not comply with the dispositions set out in Articles 33 (1) and (3) PCT.

4 Independent claim 4

Claim 4 relates to a method for deriving an alias IP address from the telephone number, whereby the alias IP address is derived from a telephone number (including area and country codes) as follows:

- the decimal telephone number (including area and country codes) is converted to a hexadecimal identifier;
- the *least* significant four (4) bytes of the converted telephone number are used as alias *IP* address;
- if the converted telephone number has a length of less than 4 bytes, it is extended with leading zeros.

Said method is not disclosed in or suggested by the documents cited in the ISR, or a combination of them.

5 Independent claim 6

Independent claim 6 relates to the apparatus adapted to perform the method

described in claims 1 to 3 and 5; these features, as stated in sections 2 to 4 of the present Written Opinion, are already known or derivable from the prior art.

The same considerations outlined with respect to claims 1 to 3 and 5 are thus also valid for independent claim 6, when referring to claims 1 to 3 and 5.

The claim does not comply with the dispositions set out in Article 33 PCT.

When referring to claim 4, independent claim 6 meets the requirements set out in Article 33 PCT.

6 Independent claims 7 and 8

Independent claims 7 and 8 disclose respectively the apparatus and the Graphical User Interface adapted to perform the method described in claims 1 to 3; these features, as stated in section 2, 3 and 4 of the present Written Opinion, are derivable from the prior art.

The same considerations outlined with respect to claims 1 to 3 are thus also valid for independent claims 7 and 8.

The subject-matters of independent claims 7 and 8 therefore do not involve an inventive step so that the claims do not comply with the dispositions set out in Articles 33 (1) and (3) PCT.

7 Independent claims 11 and 12

Independent claims 11 and 12 disclose respectively the apparatus at a remote location and at a central site adapted to perform all steps of the method described in claims 9 and 10; these features, as stated in 4 of the present Written Opinion, are derivable from the prior art.

The same considerations outlined with respect to claims 9 and 10 are thus also valid for independent claims 11 and 12.

The subject-matters of independent claims 11 and 12 therefore do not involve an inventive step so that the claims do not comply with the dispositions set out in Articles 33 (1) and (3) PCT.

8 Independent claim 13

Due to the broad formulation of its subject-matter, independent claim 13 does not comply with the dispositions set out in Articles 33 (1) and (2) PCT regarding novelty of the invention.

A method of using an arbitrary 32-bit identifier as alias IP address for the purpose of TCP/IP communication, as disclosed in claim 13, is well known in the state of the art as Internet Standard. **In particular an alias is per definition arbitrary.**

9 Independent claims 16 and 17

Independent claims 16 and 17 disclose the apparatuses adapted to perform the method described in claims 14 and 15; these features, as stated in section 4 of the present Written Opinion, are derivable from the prior art.

The same considerations outlined with respect to claims 14 and 15 are thus also valid for independent claims 16 and 17.

The subject-matters of independent claims 16 and 17 therefore do not involve an inventive step so that the claims do not comply with the dispositions set out in Articles 33 (1) and (3) PCT.

Re Item VII

Certain defects in the international application

- a) To meet requirements of Rule 6.3 (b) PCT, the independent claims should have been properly drafted in the two-part form and should include reference signs in parentheses as required by Rule 6.2 (b) PCT. In particular **only** reference signs - and not examples or definitions - should be in parentheses, (see claims 1, 2, 4, 7, 9, 10, 14).

- b) To meet the requirement of Rule 6.4 (c) PCT dependent claims 2, 3, 9, 10, 14 and 15 referring to independent claim 1 should have been grouped together to the extent and in the most practical way possible.
- c) The opening part of the description should have been modified to bring it into agreement with any amended independent claims, Rule 5.1 (a) (iii) PCT.
- d) The relevant document D4 of the International Search Report should have been acknowledged and the state of the art disclosed therein should have been briefly discussed in the opening part of the description, Rule 5.1 (a) (ii) PCT.

Re Item VIII

Certain observations on the international application (clarity)

1 Independent claims 4 and 13

Independent method claims 4 and 13 do not meet the requirements following from Article 6 PCT in combination with Rule 6 (3) (b) that any independent claim must contain all the technical features essential to the invention. Due to the broad formulation of their subject-matter, no sufficient details concerning neither the kind of communication network (tcp/ip on PSTN) nor the type of data to be transmitted (e-mails) are disclosed in the claims. These details however appear to be essential to the skilled person in order to carry out the invention, as it appears from the description about the definition of the invention (cf. page 1 lines 5-8, page 5 lines 1-9)

2 Independent claim 6

Independent claim 6 discloses the features of an apparatus adapted to perform the method described in claim 4, therefore does not meet the requirements following from Article 6 PCT in combination with Rule 6 (3) (b) for the same reasons as mentioned above in part VIII section 1 of the present Written Opinion.

3 Independent claim 8

Independent claim 8 refers to steps C, I, J disclosed in claims 1 to 3, but the telephone number of the receiver is not defined. Therefore claim 8 is not clear and does not meet the requirements following from Article 6 PCT in combination with Rule 6 (3) (b).

4 Independent claims 11 and 12

The wording "applicable steps" used in claims 11 and 12 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT). The wording "method steps" should have been replaced.

Moreover in claim 11 "the remote location" is not previously defined, therefore should have been replaced by "a remote location", Art. 6 PCT.

5 Independent claims 16 and 17

The relative terms "TeleMail-integrated System control Unit" and "appliance-integrated Appliance Control Unit" used in claims 16 and 17 have no well-recognised meaning and leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT).

6 Other observations

- a) The present Application contains 3 independent method claims and 7 independent apparatus claims, which appear to relate effectively to the same subject-matter. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to define the scope of protection.

Hence the requirements of Article 6 PCT are not met.

In order to overcome this objection, it would have been appropriate to file an amended set of claims defining the relevant subject-matter in terms of a minimum number of independent claims in each category followed by dependent claims covering features which are merely optional (Rule 6.4 PCT).

- b) Independent claims 6 to 8, 11, 12, 16 and 17 do not meet the requirements of Article 6 PCT in that it is not clear which category the claims are belonging to (see PCT Preliminary Examination Guidelines, Chapter III, 4).

In this case of claims containing both process and apparatus features, it would have been appropriate to amend the claims in such a way that they were clearly in one or in the other category.

In this connection, functional features used to define physical entities (e.g. "means for..." or "means arranged in such a way as to...") should be interpreted as features of an apparatus whereas features relating to activities in which the use of a physical entity is implied (e.g. "doing something by means of ...") should be regarded as features of a process (see PCT Preliminary Examination Guidelines, Chapter III, 3.1).

Therefore the Applicant should have replaced, for example, the expression "a stand-alone apparatus which is able to perform ..." in claim 6 by "a stand-alone apparatus able to perform", the same rewording is requested for the following expressions:

"apparatus which is connected ..., which is independently able ..." in claim 7;

"application which interfaces..., and which performs" in claim 8 (" adapted to interface ..., and to perform").

The same objection applies on claims 11, 12, 16 and 17

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For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR E-MAIL COMMUNICATION, APPARATUS THEREFOR AND USE OF SAID METHOD AND AP-
PARATUS FOR ELECTRONIC METERING AND FOR HOME AUTOMATION

(57) Abstract: The invention relates to a method for establishing e-mail communication between two users/devices who/which both
have access to the Public Switched Telephone Network, without the need of being connected to the Internet. The invention further
relates to an apparatus therefor and use of said method and apparatus for electronic metering and for home automation.

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METHOD FOR E-MAIL COMMUNICATION, APPARATUS THEREFOR AND USE OF SAID
METHOD AND APPARATUS FOR ELECTRONIC METERING AND FOR HOME AUTOMATION

Field of the invention

5 The invention relates to a method for e-mail communication, apparatus therefor and use of said method and apparatus for electronic messaging, remote reading of electronic mail and messages, for electronic metering, home automation; electronic payment by cheques and banking applications, and electronic storage of documents.

10 In a first aspect the present invention relates to a method and apparatus which allows Internet-type-communication between users connected via publicly switched telephone networks, both wired and wireless, wherein the Internet as a transport medium is not required.

The primary application thereof is electronic mail. However, the method and apparatus allow many other Internet-type applications. In particular nine important applications have been addressed here:

- 15 - Electronic messaging (similar to the so-called SMS via GSM, however, without the intermediary of a service provider),
- Remote electronic read-out of electronic mail and messages,
 - Electronic meter-reading (an application of importance for e.g. utility companies),
 - Electronic payment of cheques (and electronic banking applications),

20 - Electronic storage and archival of documents (to be extended to making financial and other surveys),

 - Home / building automation applications,
 - Storage of e-mail messages on a storage device, such as smart cards,,
 - Transmittal of data files as e-mail messages, and
 - Dispatching and messaging services.

30 New is that the method and the apparatus allow e-mail transmission between two addresses connected to the traditional public switched telephone network. New is also that signals or data, produced by devices (e.g. utility meters) can be packaged as e-mail messages and transmitted via telephony networks, and/or the Internet. The new inventive applications based on this new e-messaging concept, are:

1. All e-mail based messaging modalities, including remote reading and payment/banking applications;
2. Remote meter-reading;
3. Remote control (e.g. switching on/off) of devices/appliances connected to a

35 home/building "intra-network" (As "intra-network" in our invention serves the mains power network).

4. Electronic storage, archival and retrieval of documents. The electronically received documents and messages can be stored in a special apparatus connected to the main embodiment of the invention. The special apparatus is a storage database which archives, and from which retrieval of documents is easily possible (in addition hard copy documents can be stored via the intermediary of a scanner).

The preferred embodiment of the invention in this application is referred to as TeleMail method and TeleMail device.

The newly invented e-mail communication modality makes also electronic messaging quite convenient. The invention implies that the messaging method now applied via GSM telephony can be carried out instantaneously without the intermediary of a service provider. Furthermore, such electronic messaging can be applied between any phone-fixed or wireless - equipped with a screen.

A second aspect of the invention relates to a system and method of remotely collecting metering information from customer premises by making use of Internet technology, in combination with the TeleMail concept.

A third aspect of the present invention relates to a system and method of performing home automation functions as a TeleMail-based application. The TeleMail device is used to control a home automation network.

A fourth aspect of the invention relates to a system and method of performing electronic banking and payment functions as a TeleMail-based application. The TeleMail device is extended with a credit-card / chipcard reader. The credit-card / chipcard, made available by an institution (e.g. financial) contains proprietary information (codes, security, connections) to facilitate and secure payments and transactions. The credit-card / chipcard may also contain a restricted number of cheques or transaction forms.

Dispatching of (secured) payments may then proceed electronically to the recipient party.

For reception of payments the TeleMail device will be equipped with a dedicated device which can store received payments / cheques, which payments / cheques can subsequently be communicated to the desired institution.

A fifth aspect of the invention relates to a system and method of archiving and retrieving electronically received documents. The storage device can be connected as a dedicated peripheral unit. Documents to be stored can be labelled, and retrieved as labelled.

The storage device can similarly also handle archival and retrieval of hard-copy documents which are stored via the intermediary of an electronic scanner to be controlled by the TeleMail unit.

A sixth aspect of the invention relates to a system whereby as a special retrieving application a home bookkeeping system may be developed.

A seventh aspect of the invention relates to a system and method for storing e-mail messages or other digital information which has been received/stored by the TeleMail device, on a storage device such as smart cards (or other for mobile use practical storage media). The device according to the invention is extendable with a smart card reader. Such smart card stored information can be conveniently used in the case of e.g. cinema/train reservations or e-commerce applications.

An eighth aspect of the invention relates to a system and method to transmit data files as e-mail messages, thereby offering an alternative to proprietary data logging systems.

A ninth aspect of the invention relates to a system and method for dispatching and messaging services, to be applied for instance for truck fleet management. The invention in combination with wireless networks can be an alternative to already existing proprietary radiographic methods.

Background of the invention

Currently, communication via e-mail by users which are not permanently connected to the Internet (e.g. homes, small offices) is only possible by making use of the services provided by Internet Service Providers (ISPs). This has two important disadvantages:

sending and receiving e-mail can only be done by making use of a computer, and by accessing the Internet via the server of the ISP;

arrival of new e-mail messages can only be detected by logging in to the server of the ISP.

The first item makes e-mail communication unattractive to many potential users, since a computer poses a relatively large investment, and because still many people find a computer hard to use (even when the computer is fully configured by the vendor).

The second item also makes e-mail via ISPs unattractive, because some time-consuming steps need to be taken to detect the arrival of new (unread) e-mail messages:

- booting the personal computer;
- invoking the operating system (e.g. Microsoft Windows 98);
- starting Internet application software (e.g. Netscape);
- connecting and logging in to the Internet server.

When no new e-mail messages have arrived, this effort has been in vain.

To avoid these difficulties in the prior art, it would be desirable to provide a method and apparatus which makes e-mail communication as easily applicable and intuitive to use as, for example, telephone and facsimile communication, and which does not require involvement of third parties (e.g. an Internet Service Provider), without ruling out the possibility of Internet communication in the conventional manner (i.e. via an Internet Service Provider).

The invention provides therefor a method according to claim 1.

Preferred embodiments of the method are given in claims 2 and 3. The invention is further related to a method according to claims 4 and 5. The apparatuses of the invention are given in claims 6 to 8.

Regarding the second aspect, currently, collection of metering information (e.g. by the electricity company) is either done by persons who visit the customer location in order to read the numbers on the meter, or the customers themselves report the numbers periodically. In the latter case, the numbers still need to be verified by officials of the utility company every once in a while. This has two major disadvantages:

collection of metering information is labor-intensive and therefore costly;

the metering information cannot be used for load monitoring and anticipation;

a need exists to provide a method and system which allows utility companies to remotely collect metering information from the customer premises which – depending on the sampling frequency - can also be used for operations management purposes.

In the third aspect an interesting application of the TeleMail device can be developed, in connection with the mains power network, which can function as a home automation network.

In the following it is described how the TeleMail device can operate – via signals transmitted along the power network – various appliances in a home or a building. (N.B. The term appliance is used in the most general sense of the word. It may mean a domestic appliance, light bulb, electronic switch, heating system, etc.)

Consequently the following needs are fulfilled:

1. a person who finds himself outside his home / building can switch on/off appliances by sending the relevant information message(s) to his TeleMail device (Either using e.g. another TeleMail device, or e.g. a programmed Palmtop device);

2. the TeleMail device transmits the signal in question to the particular appliances, which will then react (e.g. switch on/off).

Summary of the invention

The present invention is a method and apparatus (consisting of hardware, firmware, and software) for establishing e-mail communication between two users/devices which both have access to the Public Switched Telephone Network (PSTN). The apparatus has sender and receiver functions.

5 An essential feature of the invention is the use of TCP/IP for communication within the realm of the Public Switched Telephone Network between two TeleMail devices which do not have to be connected to the Internet. This implies that Internet protocol suite applications can be realized in conventional networks. It also means that for a number of applications Internet connectivity and conventional connectivity become merely complementary.

10 As a sender, the appliance offers the possibility of composing, editing, opening, storing and sending e-mail messages through a Graphical User Interface (GUI) application. The messages have a TCP/IP protocol suite compliant structure and format. This includes the possibility of an attachment of data files to the e-mail message.

15 As a sender, the appliance is capable of establishing TCP/IP communication with a similar and compatible receiving device over the PSTN (either through a modem or directly over an ISDN), according to the Point-to-Point Protocol (PPP). Where IP addresses are needed for PPP and TCP/IP communication, dummy addresses are derived from the communicating parties' telephone numbers which are stored in both the sender and receiver apparatus. In a similar manner wireless communication could be realized (e.g. by using GSM as network interface).

20 As a receiver, the appliance is able to respond to an incoming telephone call by going off-hook, and establishing TCP/IP communication with the sender apparatus. Once the data communication is established, the e-mail message can be transferred to the receiver device according to the Simple Mail Transfer Protocol (SMTP) or another Internet Suite Protocol. The apparatus will be in stand-by mode as long as it is switched on.

25 As a receiver, the apparatus is able to store incoming e-mail messages and activate a visual and/or audible indicator that new e-mail has arrived.

As a receiver the apparatus is able to visually present e-mail messages through a Graphical User Interface application. This includes presentation of data files which can be attached to the e-mail message.

30 The apparatus can be realized as a stand-alone unit which accomodates all the functions needed to fulfil the service of the present invention. Alternatively, the apparatus can be realized as a peripheral device to a computer. Such peripheral would accomodate only those functions which are needed to receive, send and store incoming e-mail messages.

Since the apparatus is conceived to communicate via TCP/IP channels, it can also be employed to make use of other Internet applications, such as World Wide Web (WWW), File Transfer Protocol (FTP), etc.. For such applications, the user would need to log on to the Internet server of an ISP. Connected to the Internet, the user can also make use of the conventional e-mail service, as offered by an ISP.

Because the apparatus is able to accept calls and to receive e-mail messages autonomously, the apparatus can also be called by Internet Service Providers to transfer newly arrived e-mail messages to the premises of the e-mail addressee. Thus, it can contribute to a reduction of required disk space on the server of the ISP, and alert the addressee almost instantaneously of newly received e-mail.

Other possible TeleMail applications in the information society are given hereunder.

The obvious application is that of sending e-mail via the existing telephone networks between addresses connected to these networks. The physical connection and data link is similar to that used for data communications via telephony, the electronic message is transferred according to the TCP/IP protocol suite (in particular SMTP).

In case of e-commerce/e-business communication a display device may be required for convenience. Therefor a TV set or other display device would be appropriate.

It is mentioned here that this message transfer via traditional telephone networks is far more secure than via Internet transfer (may be of importance for e.g. messages containing sensitive data).

The user of a TeleMail device can communicate to Internet addresses, via telephoning an Internet access provider. For e-commerce/e-business applications, a TV set or another display device could be used when the communication requires visualization.

Businesses/Institutions can communicate with TeleMail devices using either Internet or traditional network communications, on the basis of the TCP/IP communication, and the message forwarding included in the TeleMail concept.

This may become quite advantageous e.g. in the following cases:

1. Each physical address, accessible via telephone connectivity can receive e-mail and thus replace traditional mail. This may lead to significant cost savings for businesses/organizations due to the 'short-circuiting' of the traditional mailing system.

2. Each physical address, accessible via telephone connectivity, can be contacted by utility companies for (periodic) meter-reading. As an instance this may be of advantage for electricity companies' load management system and program responsibility. Obviously this will lead to

significant cost savings. This application may require special arrangements to safeguard privacy (see the second aspect of the present invention).

3. The Telemail device can be used as a central server of a home "intranetwork". Such TeleMail device can store a website. Consequently, each appliance at a physical address, connected to the home "intranetwork" is accessible via telephone connectivity, and can be operated via the public switched telephone network by interacting between its TeleMail website and a device connected elsewhere to the telephone network (e.g. palmtop or other TeleMail device). Obviously this will lead to a straightforward operation of appliances in a home (or building) and somebody operating from the outside.

Call-centers are increasingly being contacted also via e-mail. The TeleMail device also provides call-center communication. Also for the functioning of the call-center the TeleMail connectivity is advantageous, since confirmations of agreements can be forwarded on-line.

Businesses are able to improve direct marketing methods since they can combine within their ICT systems results of their data mining and contact customers via TeleMail efficiently and effectively.

Since TeleMail devices can be used like telephony devices, messages can be delivered anywhere/anytime, much more readily than in case of "conventional" e-mail communication which has to go via a PC.

For Businesses/Institutions significant financial benefits may develop since the number required of software licences could be reduced drastically.

The second aspect of the present invention is a method and system according to claims 9-13 (consisting of hardware, firmware, and software) for establishing e-mail communication through the Public Switched Telephone Network (PSTN) between a device installed at the customer premises (called MeterNet Box) and a host at the premises of the utility company (called MeterNet Host), which interfaces with the server of the utility company. The devices at both ends have sender and receiver capabilities, and both have access to the PSTN.

The data communication between Box and Host is established and maintained according to the TCP/IP protocol suite (PPP in particular), the physical connection being provided through a modem or ISDN. The data communication provides a full-duplex path to the applications at both ends.

Two scenarios apply for the operation of the present invention. In the first scenario, the MeterNet Box at the customer location is polled by the MeterNet Host to retrieve metering information (e.g. at regular intervals for billing purposes). In the second scenario, the MeterNet Box

at the customer location autonomously establishes a connection to the MeterNet Host (e.g. for status and error reporting, or upon detection of events specified by the utility company). To avoid costs at the customer's expense in the latter case, the utility company may provide a toll-free number for dial-in connections.

5 Once the data communication between Box and Host (or vice versa) has been established, the Box application can exchange information with the Host application. To identify itself to the Host application, the Box is assigned a unique 32-bit identifier which is also used as (alias) IP address for protocol purposes.

10 Since the utility company can access the metering information without knowledge of the customer, it may be desirable or even required to send a notification to the customer that the information has been collected (either via electronic or postal mail).

 The third aspect TeleControl functionality is an application based on the TeleMail platform according to claims 14-18. Two major functions can be distinguished within the TeleControl application:

- 15 1. centralized, user-definable control over accessible devices;
 2. providing remote access to the above function.

20 The first function is realized by connecting a home automation control unit to one of the general-purpose interfaces of the TeleMail device. The control-unit can address other units through a power-line modem. These units in their turn can control devices such as light bulbs, switches, heating systems, domestic appliances, alarm systems, etc.. Alternatively, the control unit can be integrated in the TeleMail device enclosure.

25 The user can access the TeleControl functionality through a graphical user interface (GUI) which runs as a TeleMail application. For example, the graphical user interface consists mainly of an HTML file, which can be presented with any compliant web browser application. Through the user interface, the user can invoke Common Gateway Interface (CGI) processes on the TeleMail device, which in their turn control a target device.

30 Remote access to the TeleControl (second function) functionality is provided by calling the TeleMail device and loading the TeleControl HTML file into a web browser at the remote location. A personal computer with modem or other TeleMail device can be used for this purpose.

Brief Description of the Drawings

In the drawings three sets of figures are given. The same reference numbers have been used for each of the separate sets 1, 2 and 3. 1, 2 and 3 respectively are illustrations of embodiments of the first, second and third aspect of the invention.

5 Figure 1A is a functional block diagram of the TeleMail system according to the present invention, including two (2) TeleMail devices [T1] and [T2] at the user premises, and a TeleMail device [T3] at the premises of an Internet Service Provider, all with access and connected to the Public Switched Telephone Network [PSTN].

Figure 1B is a functional block diagram of an embodiment of a stand-alone TeleMail device [T4], according to the present invention.

10 Figure 1C is a functional block diagram of an embodiment of a computer-peripheral TeleMail device [T5], according to the present invention.

Figure 1D is a functional block diagram of an embodiment of a TeleMail device [T6] employed for forwarding e-mail messages from the ISP premises to the user premises, according to the present invention.

15 Figure 1E is an architecture diagram of the TeleMail embedded software [AS1], according to the present invention.

Figure 1F is a functional block diagram of the TeleMail application software [AS2] for forwarding e-mail messages to a TeleMail device by an Internet Service Provider, according to the present invention.

20 Figure 1G is a simplified OSI model representation of the TeleMail communication through an ITU-T I.series compliant Integrated Services Digital Network (ISDN).

Figure 1H is a simplified OSI model representation of the TeleMail communication over an ITU-T V.series compliant modem (e.g. V.32, V.34, V.90) over the Public Switched Telephone Network.

25 Figure 2A provides an overview of the MeterNet system, according to the present invention, including a number of MeterNet Boxes [M1], [M2] and [M3] at the customer premises, and a MeterNet Host [H1] at the premises of a Utility Company with connection to the Utility Company Server; all devices are connected and have access to the Public Switched Telephone Network [PSTN].

30 Figure 2B is a functional block diagram of an embodiment of a MeterNet Box [M4], according to the present invention.

Figure 2C is a functional block diagram of an embodiment of a MeterNet Host [H2], according to the present invention.

Figure 2D is a flowchart description of the procedure to collect metering information from a single MeterNet Box.

Figure 2E is a flowchart description of the procedure to report information by a single MeterNet Box to a MeterNet Host.

5 Figure 2F is a simplified OSI model representation of the MeterNet communication over an ITU-T V.series compliant modem (e.g. V.32, V.34, V.90) over the Public Switched Telephone Network.

Figure 2G is a simplified OSI model representation of the MeterNet communication through an ITU-T I.series compliant Integrated Services Digital Network (ISDN).

10 Figure 3A provides an overview of the TeleControl system, according to the present invention, including a set of two TeleMail devices [TM1] and [TM2], a TeleControl System Control Unit [SCU], and a number of Appliance Control Units [ACU1], [ACU2], and [ACU3]; all control units are connected to the in-house mains network [MNW]. The Appliance Control Units interface with appliances [APP1], [APP2], and [APP3], respectively. An Application Control Unit may also be
15 integrated in the appliance enclosure, as illustrated for [ACU3/APP3]. Both TeleMail units are connected to the Public Switched Telephone Network [PSTN]. Both TeleMail units have a display [DIS] as output device for the TeleControl Graphical User Interface. The display of TeleMail device [TM2] is not shown.

20 Figure 3B is a functional block diagram of an embodiment of a System Control Unit, according to the present invention.

Figure 3C is a functional block diagram of an embodiment of an Appliance Control Unit, according to the present invention.

Figure 3D is an architectural block diagram of the TeleControl application.

25 Detailed Description of the Invention

Figure 1A shows two TeleMail communication devices 101 and 102 of the present invention, and the system in which it operates. Both devices have access to the Public Switched Telephone Network (PSTN) 104 through subscriber loops (114 and 115). The sender device 101 opens a switched telephone connection 106 through the PSTN 104. Once the connection is
30 established, transfer of the electronic data between the sender and receiver applications commences.

In Figure 1A, a TeleMail device 103 which is employed for forwarding e-mail messages from a Mail Server 112 to a TeleMail device 101 at the customer premises is also depicted. In this

case the TeleMail device 101 functions as a receiver. Upon arrival of an e-mail message destined for a user who has a TeleMail device, the e-mail message is forwarded to the TeleMail device 103 at the premises of the Internet Service Provider (ISP). This TeleMail device maintains a database with the telephone numbers of all addressees who make use of the e-mail forwarding service. The
5 TeleMail device 103 opens a switched telephone connection 105 through the PSTN 104. Once the connection is established, transfer of the electronic mail from the ISP to the receiver application commences.

A block diagram of a stand-alone embodiment of a TeleMail device, according to the present invention, is shown in Figure 1B. Apart from the data transmission and line interfacing, all
10 functions are performed by a microprocessor 201. The microprocessor is supported by memory 205, which comprises both volatile and non-volatile memory. The microprocessor provides its output on a display 202. The user provides input through a keyboard 203 and a pointing device 204. When a touch-screen is used as display, both keyboard and pointing device can be incorporated in the touch-screen. The microprocessor 201 has some general purpose interfaces
15 (e.g. serial and parallel ports, USB) at its disposal which can be used to add peripherals (e.g. a printer, a Web camera, a joystick) as enhancement to the TeleMail functionality.

The line interface circuitry 208 is able to detect an incoming call, upon which it alerts the microprocessor. Thus, the TeleMail device is able to act as a receiver.

A block diagram of a computer-peripheral embodiment of a TeleMail device, according to the present invention, is shown in Figure 1C. Apart from the data transmission 307 and line
20 interfacing 308, all functions are performed by a microprocessor 301. The microprocessor is supported by memory 306, which comprises both volatile and non-volatile memory. The microprocessor provides status information through perceptible (e.g. visual and/or audible) indicators 305. The computer-peripheral TeleMail device is configured by a host Personal
25 Computer (PC) 302 through one of the interfaces 303 or 304. A TeleMail host application on the host PC 302 provides the (graphical) user interface with the user. E-mail message composition is done on the host PC. The outgoing messages are transferred from the host PC to the computer-peripheral TeleMail device through one of the interfaces 303 or 304.

Since the computer-peripheral TeleMail device has its own power supply, it is able to
30 receive incoming messages, independent of the host PC, in particular also when the PC is disconnected or powered down. Incoming messages are stored in memory 306, until the connection to the host PC 302 is (re)established. Once the connection is (re)established, the received messages are transferred to host PC 302 through one of the interfaces 303 or 304. Thus,

the computer-peripheral TeleMail device can be seen as an enhanced (external) modem, with autonomous message receiving capabilities.

A block diagram of a TeleMail device which is employed at the premises of an Internet Service Provider (ISP) for forwarding of e-mail messages to a TeleMail device at the user premises, according to the present invention, is shown in Figure 1D. The main difference with the computer-peripheral TeleMail device described above (Figure 1C) consists of the Ethernet interface with the host computer, and the host application software. Also, the ISP TeleMail device offers both an analog (modem) and digital (ISDN) telephone line interface.

Apart from the data transmission 405/406 and line interfacing 407/408, all functions are performed by a microprocessor 401. The microprocessor is supported by memory 402, which comprises both volatile and non-volatile memory. The microprocessor provides status information through visual and/or audible indicators 403. The ISP TeleMail device is configured by a host computer (PC) 409 through the Ethernet interface 404.

E-mails which arrive at the mail server of the ISP are transferred to the host computer 409 when the addressee makes use of the TeleMail message forwarding service. A database application on the host computer maintains a TeleMail database 410 of all e-mail addressees who make use of the TeleMail message forwarding service. The host computer retrieves the telephone number, and the line interface type (analog or ISDN) of the addressee TeleMail device from the TeleMail database. Along with the telephone number and line interface type information, the e-mail message is transferred to the ISP TeleMail device which transmits it to the TeleMail device of the e-mail addressee.

An architecture block diagram of the TeleMail software, according to the present invention, is shown in Figure 1E. The TeleMail software consists of a Graphical User Interface (GUI) 501, application software 502, an operating system 503, and hardware drivers 504. Although primarily intended for e-mail communication, other applications can be installed as enhancements, which may require that the TeleMail is equipped with additional peripherals. For example, if a web camera is connected to the TeleMail devices at both ends (e.g. T1 and T2 in Figure 1A), it can be used for low-bandwidth video conferencing. Printing and scanning devices, addressed through the general purpose interfaces, can also provide added functionality.

A functional block diagram of the ISP TeleMail database software for forwarding of e-mail messages to a TeleMail device at the user premises, according to the present invention, is shown in Figure 1F. The software consists of two subsystems: a database application on the host computer, and an embedded TeleMail application on the processor of the ISP TeleMail device.

Messages which are forwarded by the ISP mail server to the ISP TeleMail host computer through interface 603, are fed into a first-in first-out (FIFO) receive queue 601, to avoid information loss in case of bursty message arrival. The size of this queue can be changed dynamically. The e-mail messages are read from the receive queue (function 602), after which the telephone number and line interface type (modem or ISDN) is retrieved from a TeleMail database 604. The e-mail message, along with the telephone number and line type of the addressee TeleMail device is then transferred to the ISP TeleMail device for further processing.

The embedded ISP TeleMail software assigns the message to an output queue, depending on the line interface type (function 606). For addressees with an analog (modem) line interface, the message is fed into the Modem Output Queue 607, after which it is physically transferred to the addressee TeleMail device (function 609). For addressees with a digital (ISDN) line interface, the message is fed into the ISDN Output Queue 608, after which it is physically transferred to the addressee TeleMail device (function 610).

Depending on the type of subscriber loop (POTS or ISDN), the protocol stack differs. Figure 1G shows the protocol stack for POTS, Figure 1H shows the protocol stack for ISDN. The only difference lies in the physical layer which is a modem in case of POTS, or an ISDN interface directly in case of an ISDN.

Where IP addresses are needed for TCP/IP and PPP communication between two TeleMail devices which are not connected to the Internet, they are derived from the telephone number as follows:

I. The decimal telephone number (including area and country codes) is converted to a hexadecimal identifier;

II. The least significant 4 (four) bytes of the converted telephone number are used as alias IP address.

III. If the converted telephone number has a length of less than 4 bytes, it is extended with leading zeros.

For communication with an Internet server, the TeleMail device will be assigned a temporary IP address for the duration of the connection from an address pool maintained by the Internet server (according to the PPP-DHCP protocol).

In DE 197 13 240 A an address assignment system is described where peripherals propose a totally random address which is then confirmed or must be re-proposed until confirmation. Address assignment by telephone number is more efficient.

A number of MeterNet Box (101, 102, 103) and a MeterNet Host device (105) of the present invention, and the system in which it operates is shown in Figure 2A. All devices have access to the Public Switched Telephone Network (PSTN) 104 through subscriber loops (108, 109, 110, and 111). The MeterNet Host device 105 also communicates with a server computer of the utility company (106). In order to establish communication between the MeterNet Box 102 and the MeterNet Host 105, either device can open a switched telephone connection 107 through the PSTN 104. Once the connection is established, transfer of the electronic data between the sender and receiver applications commences.

A block diagram of an embodiment of a MeterNet Box device, according to the present invention, is shown in Figure 2B. Apart from the data transmission 202 and line interfacing 203, all functions are performed by a microprocessor 201. The communication port 202/203 can be an analog modem interface or a digital ISDN interface. The microprocessor is supported by memory 204, which comprises both volatile and non-volatile memory. The microprocessor 201 has a meter interface 206 at its disposal which can be used to collect information from a compatible meter (not depicted). The line interface circuitry 203 is able to detect an incoming call, upon which it alerts the microprocessor 201. The MeterNet Box also comprises a storage unit 205 for a unique permanent 32-bit identifier, which also serves as alias IP address during TCP/IP communication.

A block diagram of an embodiment of a MeterNet Host device, according to the present invention, is shown in Figure 2C. Functionally, the MeterNet Host has two communication ports at its disposal: one for (analog) modem communication 302/303, one for (digital) ISDN communication 304/305. Depending on to which type of subscriber loop the MeterNet Box device is connected, the compatible communication port is selected. Physically, a MeterNet Host can comprise an arbitrary number of either port type. Apart from the data transmission 302/304 and line interfacing 303/305, all functions are performed by a microprocessor 301. The microprocessor is supported by memory 306, which comprises both volatile and non-volatile memory. The microcontroller communicates with a server computer over a server interface 307. The MeterNet Host can either be controlled and configured by software on the server computer, or provide a dedicated interface for this purpose.

A flowchart description of the procedure to collect metering information from a MeterNet Box by a MeterNet Host, according to the present invention, is shown in Figure 2D. Most likely the procedure is executed mainly by a software system. Functionally and physically, the procedure to retrieve information from a MeterNet Box by a MeterNet Host is divided over two subsystems: a database application on the server computer, and embedded software executed by the

microprocessor of the MeterNet Host device. Both subsystems communicate with each other through the server interface of the MeterNet Host device. Please refer to the above description of Figure 2C for details.

The core function of the MeterNet database application consists of a scheduler 401. The scheduler 401 is responsible for servicing requests to collect information of a MeterNet Box device. The request can be either periodically at user-definable intervals, upon detection of user-definable conditions, or at the user's immediate request. A scheduler interface 413 provides access to the pending requests (e.g. for cancellation of a request). Once a request is serviced it is referred to as a job. A job also has knowledge of the information that needs to be collected from the addressed MeterNet Box. A job starts (step 402) with the retrieval of a telephone number and line interface type (POTS or ISDN) of the addressed MeterNet Box from a database 403. Both parameters are then transferred to the MeterNet Host device for further processing (step 404). In the MeterNet Host the job is fed into a job queue, depending on the line type of the addressed MeterNet Box (step 405). For each line type, an independent job queue is provided.

From the job queue, the jobs are fetched by the next step in the procedure (steps 408 and 409, for digital and analog line interfaces, respectively). In this step, the MeterNet Host opens a switched telephone connection to the addressed MeterNet Box, requests and receives the information from the addressed MeterNet Box, and terminates the connection. After successful collection of the requested information, the information is transferred to the server (step 410). The server updates the database with the newly acquired information (step 411), and schedules the next request (step 412).

A flowchart description of the procedure to report metering information by a MeterNet Box to a MeterNet Host, according to the present invention, is shown in Figure 2E. Upon detection of an event which was marked as requiring a report to the MeterNet Host (event 501), the MeterNet Box opens a switched telephone connection to the MeterNet Host (step 502). The MeterNet Host detects the incoming call (step 503), and responds by going off-hook (step 504), after which the data link is initialized (step 505) in accordance with the Point-to-Point Protocol (PPP). After establishment of the data link, the data is transferred by the MeterNet Box to the MeterNet Host (step 506). After successful reception, the MeterNet Host triggers the update of the database 510 with the newly acquired information (step 507). If no further information is needed, the data link (step 508) and telephone connection (step 509) are terminated.

Depending on the type of subscriber loop (POTS or ISDN), the protocol stacks differ. Figure 2F shows the protocol stack for POTS, Figure 2G shows the protocol stack for ISDN. The

only difference lies in the physical layer which is a modem in case of POTS, or an ISDN interface directly in case of an ISDN.

A System Control Unit (102) and a number of Appliance Control Units (104, 105, 106) connected to the respective appliances (107, 108, 109), and a TeleMail-based Graphical User Interface (GUI) application (110) of the present invention, and the system in which it operates is shown in Figure 3A. The application 110 runs on the TeleMail device 101; it provides output on the display 104. For reasons of simplicity, in this description the display 104 has touchscreen capabilities, and thus also functions as input device. This does not rule out other TeleMail device-configurations.

Only for remote access, do both TeleMail 101 and 111 devices need to be connected to the Public Switched Telephone Network 112.

The GUI application 110 can be configured to suit the needs of the user. The user can add or remove new appliances. The GUI application will provide a control in the GUI screen for each appliance addressed by the TeleControl application; and provide all necessary underlying software modules (see description of Figure 3D). A number of controls is shown in the GUI application 110 of Figure 3A.

To illustrate the TeleControl functionality, appliance 107 is considered to be a light bulb, which can be switched on or off. If the user wants to change the state of the light bulb 107 (e.g. turn it off), he/she can invoke the GUI application 110, which contains a control for each appliance addressed by the TeleControl application. The user can then activate the respective control in the GUI screen to perform the desired action.

Activation of the appliance control in the GUI screen will cause the GUI application to invoke a CGI process on the TeleMail device. The CGI process will trigger a message to be sent from the TeleMail device to the System Control Unit 102. The System Control Unit will broadcast a message onto the mains network 103, destined for Appliance Control Unit 104.

The message contains the unique identifier of Appliance Control Unit 104, and the instruction that needs to be performed (e.g. "turn off"). Due to the nature of broadcasting all Appliance Control Units (104, 105, 106) will receive the message; only Appliance Control Unit 104 will handle the message, based upon recognition of its identifier.

The user can access the TeleControl application from a remote location by using another TeleMail device 111 to call the TeleMail device at the user premises 101. Once the telephone connection 113 through the Public Switched Telephone Network 112 has been established, the user can load the GUI application into a web browser on TeleMail device 111. Activating the

controls in the GUI, has the same effect as accessing them locally (i.e. on TeleMail device **101**), as described above. Alternatively, also a PC can be utilized to communicate with the home TeleMail device.

A block diagram of an embodiment of a System Control Unit, according to the present invention, is shown in Figure 3B. Apart from the power-line modem functions **202** and mains interfacing **203**, all functions are performed by a microprocessor **201**. The microprocessor is supported by memory **204**, which comprises both volatile and non-volatile memory. The microprocessor **201** has a TeleMail interface **206** at its disposal which is used to receive command message and transmit report from/to the TeleMail device. The mains interface circuitry **203** connects to the mains network. The System Control Unit also comprises a storage unit **205** for a unique permanent network identifier. This identifier is used in combination with the identifiers of the connected Appliance Control Units to uniquely qualify the Appliance Control Units within a home automation network (see below).

A block diagram of an embodiment of an Appliance Control Unit, according to the present invention, is shown in Figure 3C. Apart from the power-line modem functions **302** and mains interfacing **303**, all functions are performed by a microprocessor **301**. The microprocessor is supported by memory **304**, which comprises both volatile and non-volatile memory. The microprocessor **301** has an appliance interface **306** at its disposal which is used to control the connected appliance. The mains interface circuitry **303** connects to the mains network. The Appliance Control Unit also comprises a storage unit **305** for a unique assignable identifier.

An architectural block diagram of the TeleControl application is shown in Figure 3D. The Graphical User Interface **401** consists of controls (**402**, **403**, **404**) to address appliances connected to the home automation network. It also contains a control to access and configure scheduler **406**. The scheduler **406** provides time-based operations on the appliances such as delayed execution of instructions, or at user defined (fixed or irregular) intervals. The appliance controls invoke a related Common Gateway Interface (CGI) process (**407**, **408**, **409**). The CGI processes make use of the System Control Unit device driver **410** to control the appliances addressed by the System Control Unit hardware **411**. The scheduler **406** also makes use of the same CGI processes (**407**, **408**, **409**) to perform its functions.

CLAIMS

1. A method for establishing e-mail communication between two users/devices who/which both have access to the Public Switched Telephone Network, without the need of being connected to the Internet, comprising the steps of:

A) establishing the data link, and PPP connection between the sender and receiver application; and

B) transferring the e-mail message(s) to the receiver device over TCP/IP.

2. A method according to claim 1, further comprising the steps of:

C) composing one or more electronic mail messages through a Graphical User Interface application;

D) setting up a telephone connection to receiver device;

E) acceptance of the call by the receiver device;

F) storage of the e-mail message(s) on the receiver device;

G) termination of the data link and telephone connection;

H) perceptible (e.g. visual and/or audible) indication that an e-mail message has been received by the receiver application;

I) visual presentation of the e-mail message (including attached files) by the receiver Graphical User Interface application.

3. A method according to claim 1 or 2, further comprising the step of:

J) retrieving the telephone number of the receiver from a database;

4. A method of deriving an alias IP address from the telephone number, whereby the alias IP address is derived from a telephone number (including area and country codes) as follows:

- the decimal telephone number (including area and country codes) is converted to a hexadecimal identifier;

- the least significant four (4) bytes of the converted telephone number are used as alias IP address;

- if the converted telephone number has a length of less than 4 bytes, it is extended with leading zeros.

5. Method according to one of the previous claims 1-4, further comprising the step of forwarding an e-mail message from a mail server at the premises of an Internet Service Provider, to the receiver.

6. A stand-alone apparatus which is able to perform all the steps presented in one of the previous claims 1-5, both as receiver and sender.

7. Apparatus which is connected to a computer through an interface (e.g. RS-232), and which is independently able to perform the steps A, B, D, E, F and G in the previous claims 1-3, both as receiver and sender.

8. A Graphical User Interface application which interfaces with the apparatus presented in claim 7, and which performs the steps C, I and J presented in the previous claims 1-3.

9. Method of establishing communication according to claim 1 from a central host to devices at remote locations, all with access to the Public Switched Telephone Network (PSTN), in order to collect information from meters, comprising the steps of:

- a) setting up a telephone connection from the central host to the device at the remote location;
- b) acceptance of the call by the receiver device;
- c) establishing the data link, and PPP connection between the sender and receiver application;
- d) transfer the information to the host device over TCP/IP;
- e) Termination of the data link and telephone call;
- f) updating of the database by the host with the received information.

10. Method of establishing communication according to claim 1 to a central host by devices at remote locations, all with access to the Public Switched Telephone Network (PSTN), in order to transfer information from meters to the central host, comprising the steps of:

- a) setting up a telephone connection to the central host by the device at the remote location;
- b) acceptance of the call by the host device;
- c) establishing the data link, and PPP connection between the sender and receiver application;
- d) transfer the information to the host device over TCP/IP;
- e) termination of the data link and telephone call;
- f) updating of the database by the host with the received information;

11. Stand-alone apparatus to be installed at the remote location which is able to perform all the applicable steps presented in claims 9 and 10, both as receiver and sender.

12. Host apparatus to be installed at the central site which is able to perform all the applicable steps presented in claims 9 and 10, both as receiver and sender.

13. Method of using an arbitrary 32-bit identifier as alias IP address for the purpose of TCP/IP communication.

14. Method according to claim 1 of providing home automation network functionality as a TeleMail-based application, comprising the steps of:

5 a) connecting a System Control Unit to the TeleMail device, and to the in-house mains network;

b) inserting Appliance Control Units between the controlled appliances, and to the in-house mains network;

c) installation and configuration of the TeleControl application on the TeleMail device;

10 d) invocation of the TeleControl Graphical User Interface program;

e) activation of controls in the Graphical User Interface, which are directly related to an addressable appliance;

f) invocation of a Common Gateway Interface (CGI) process on the TeleMail device, to transfer an instruction to the addressed appliance through System Control Unit, and the mains network, to the Appliance Control Unit;

15 g) reception and evaluation of the instruction by the Appliance Control Unit;

h) execution of the instruction by the Appliance Control Unit;

i) closing of the TeleControl Graphical User Interface program;

20 15. Method according to claim 1 of automating the control over Appliances addressed by the TeleControl application, and connected to the mains network by means of a Scheduler as integrated function of the Graphical User Interface application, comprising the steps of:

a) invocation of the TeleControl Graphical User Interface program;

b) activation of the Scheduler control in the TeleControl Graphical User Interface program;

c) invocation and presentation of the Scheduler Graphical User Interface;

25 d) configuration of the Scheduler;

e) scheduling of actions at user-definable moments, and at user-definable fixed or irregular intervals;

f) closing of the Scheduler Graphical User Interface;

g) closing of the TeleControl Graphical User Interface program;

30 h) independent background execution of the scheduled actions by the Scheduler function, as described in steps F) through H) of claim 1.

16. Stand-alone or TeleMail-integrated System Control Unit to be connected to the TeleMail device, and to the mains network, which is able to perform all the applicable steps presented in claims 14 and 15.

5 17. Stand-alone or appliance-integrated Appliance Control Unit to be connected to the addressed appliance, and to the mains network, which is able to perform all the applicable steps presented in claims 14 and 15.

18. Method according to claims 14 – 17 comprising a unique System Control Unit identifier, and an assignable Appliance Control Unit identifier to uniquely qualify a home automation network, and the member Appliance Control Units connected to it.

10 19. Method of combining a unique System Control Unit identifier, and an assignable Appliance Control Unit identifier to uniquely qualify a home automation network, and the member Appliance Control Units connected to it.



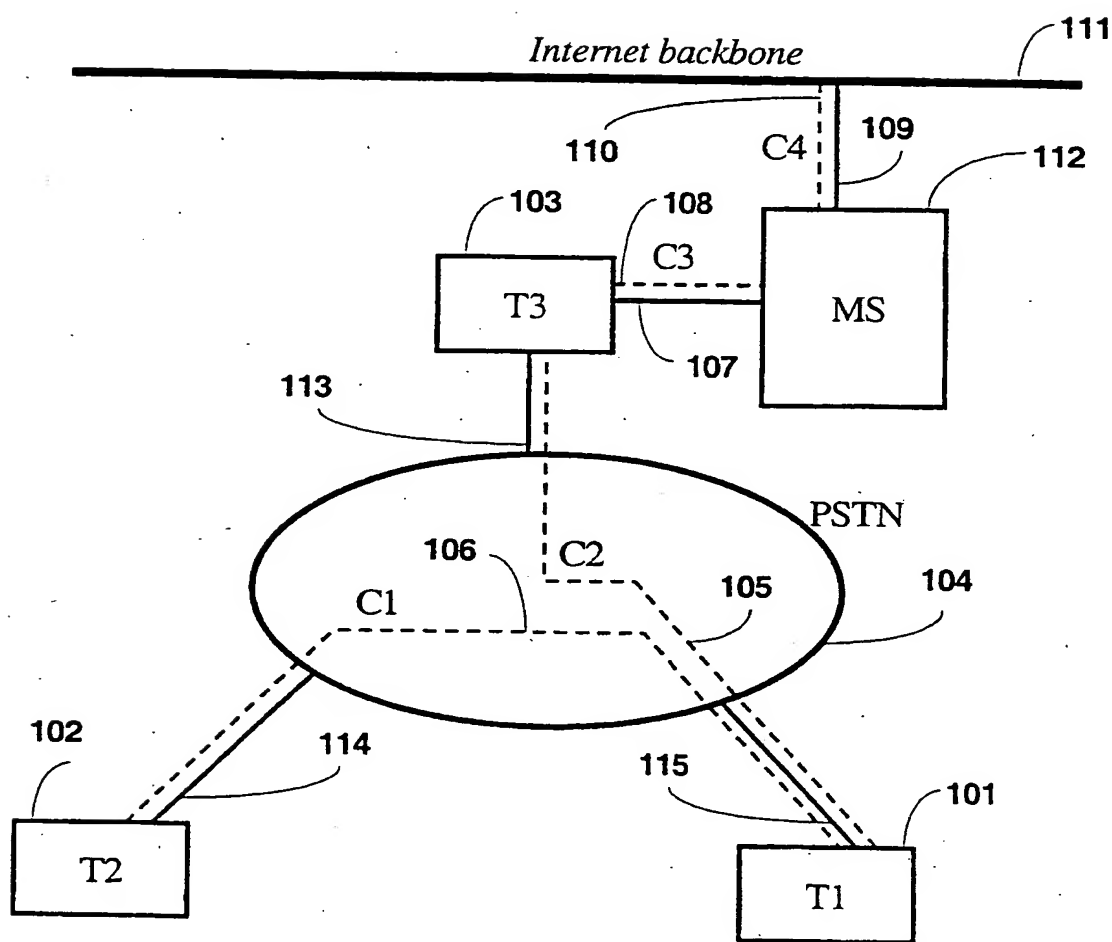


Figure 1A



2/19

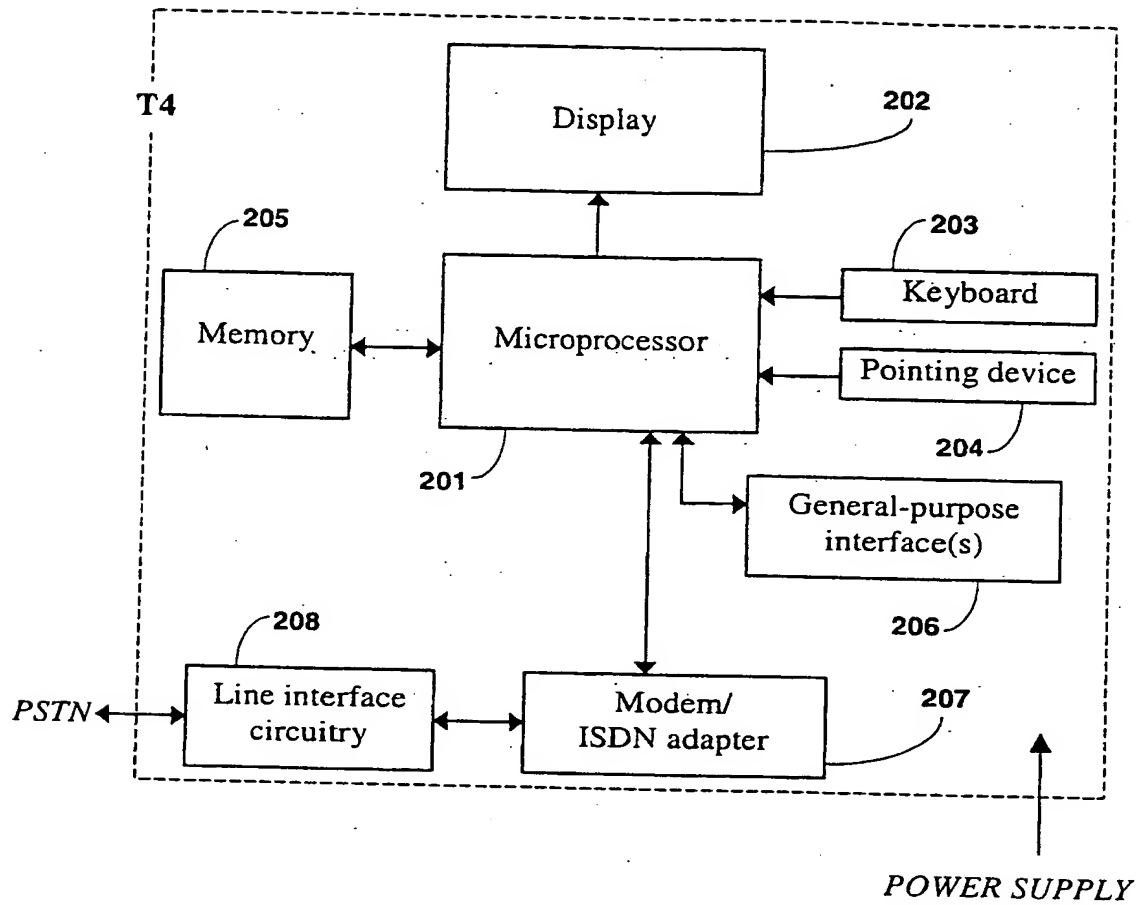


Figure 1B



3/19

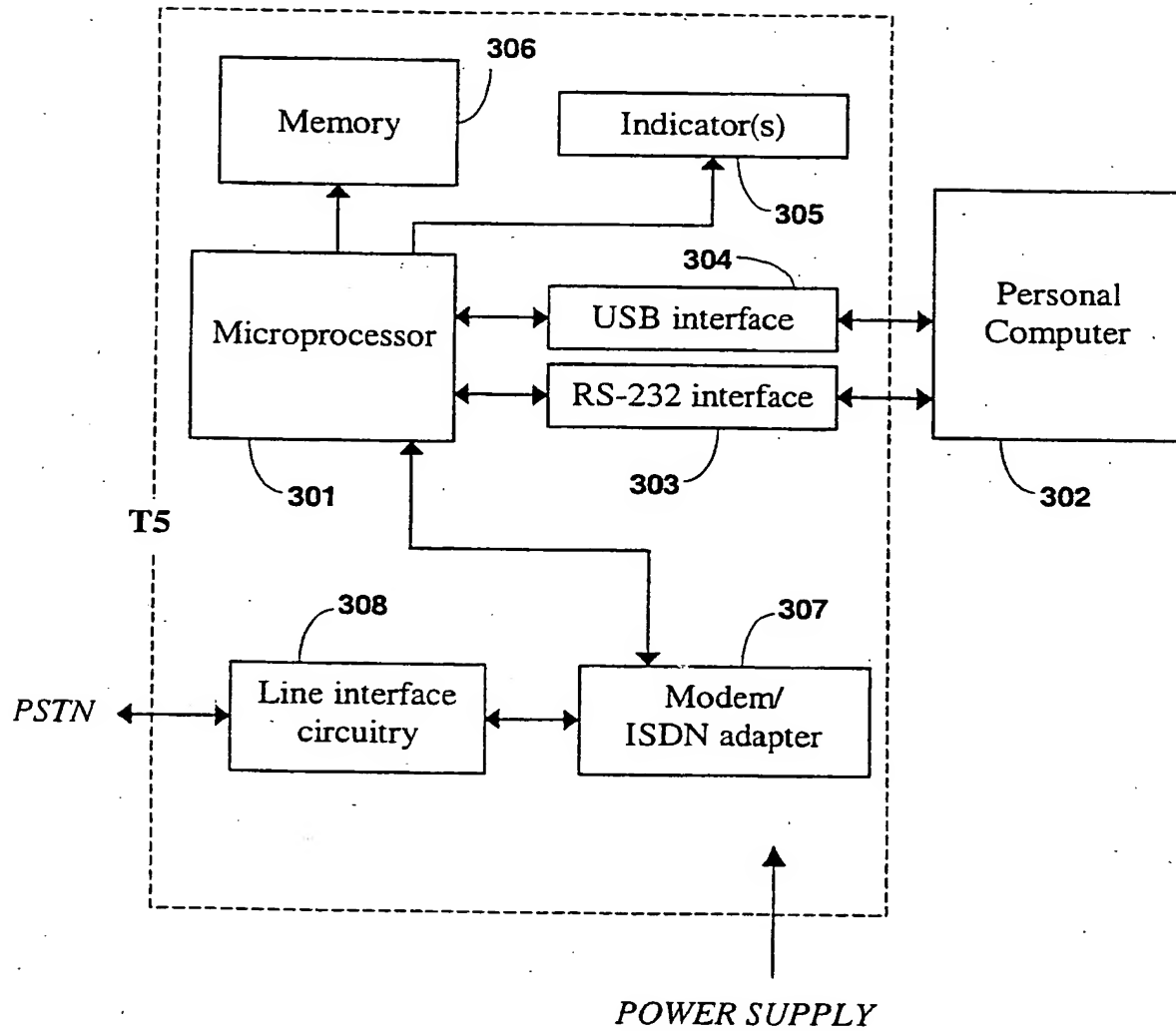


Figure 1C



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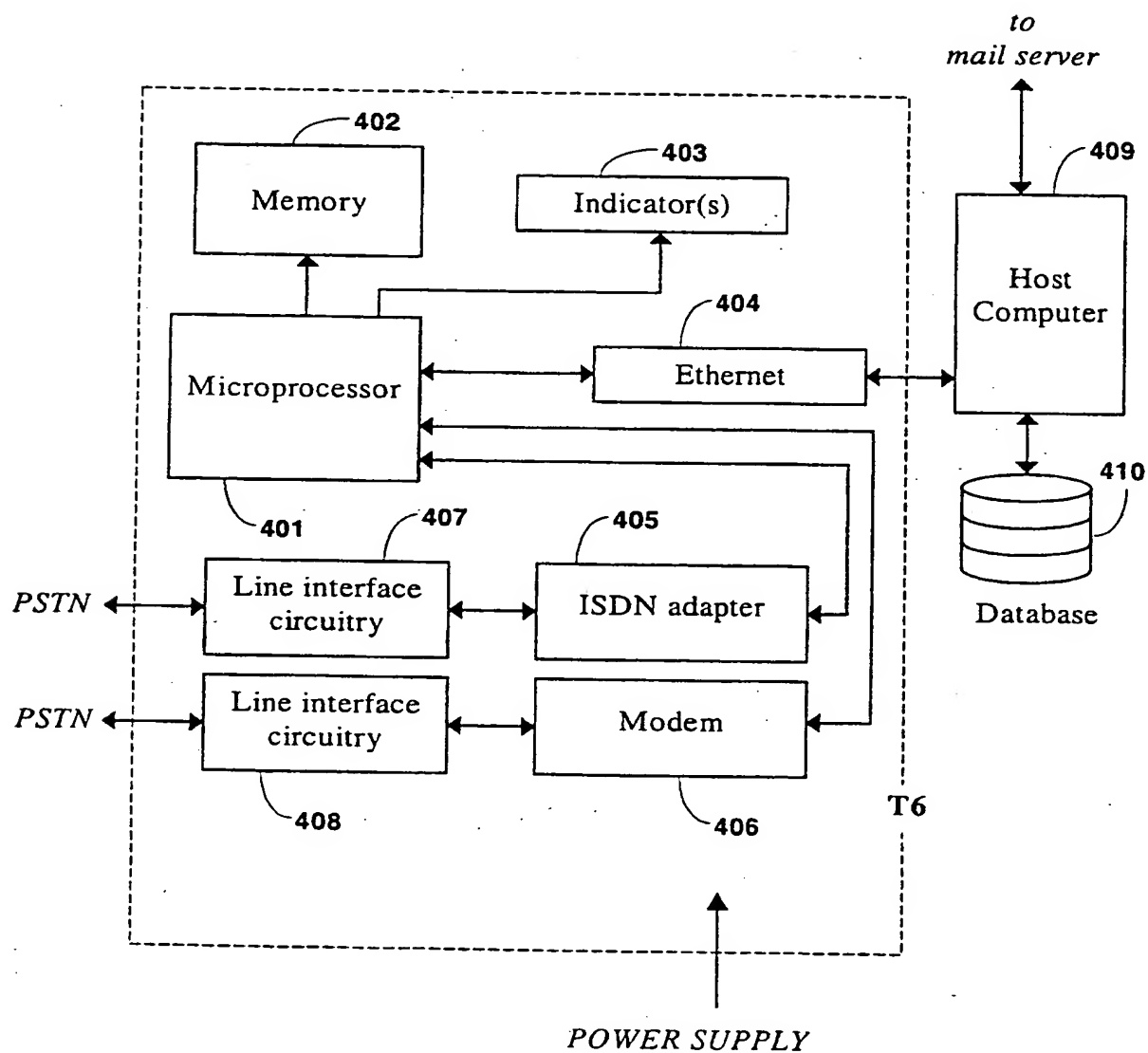


Figure 1D

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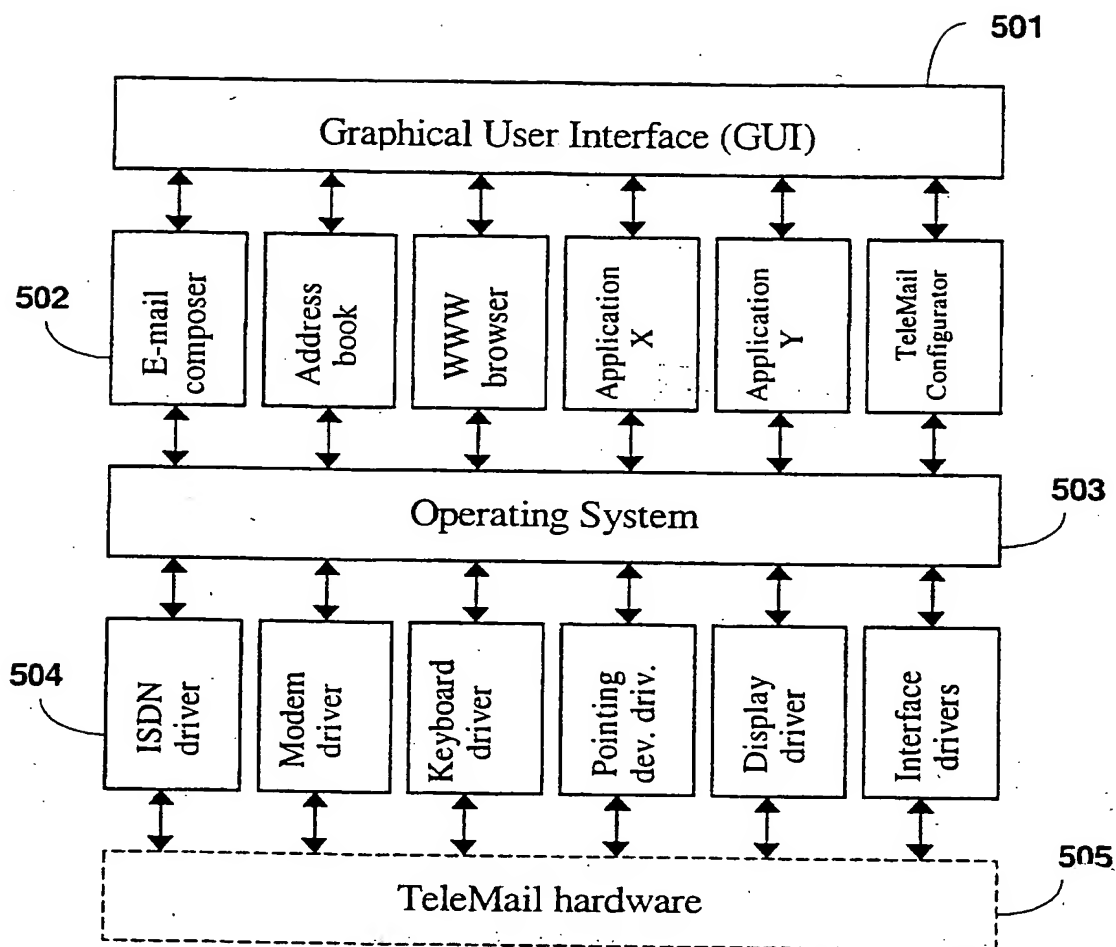


Figure 1E



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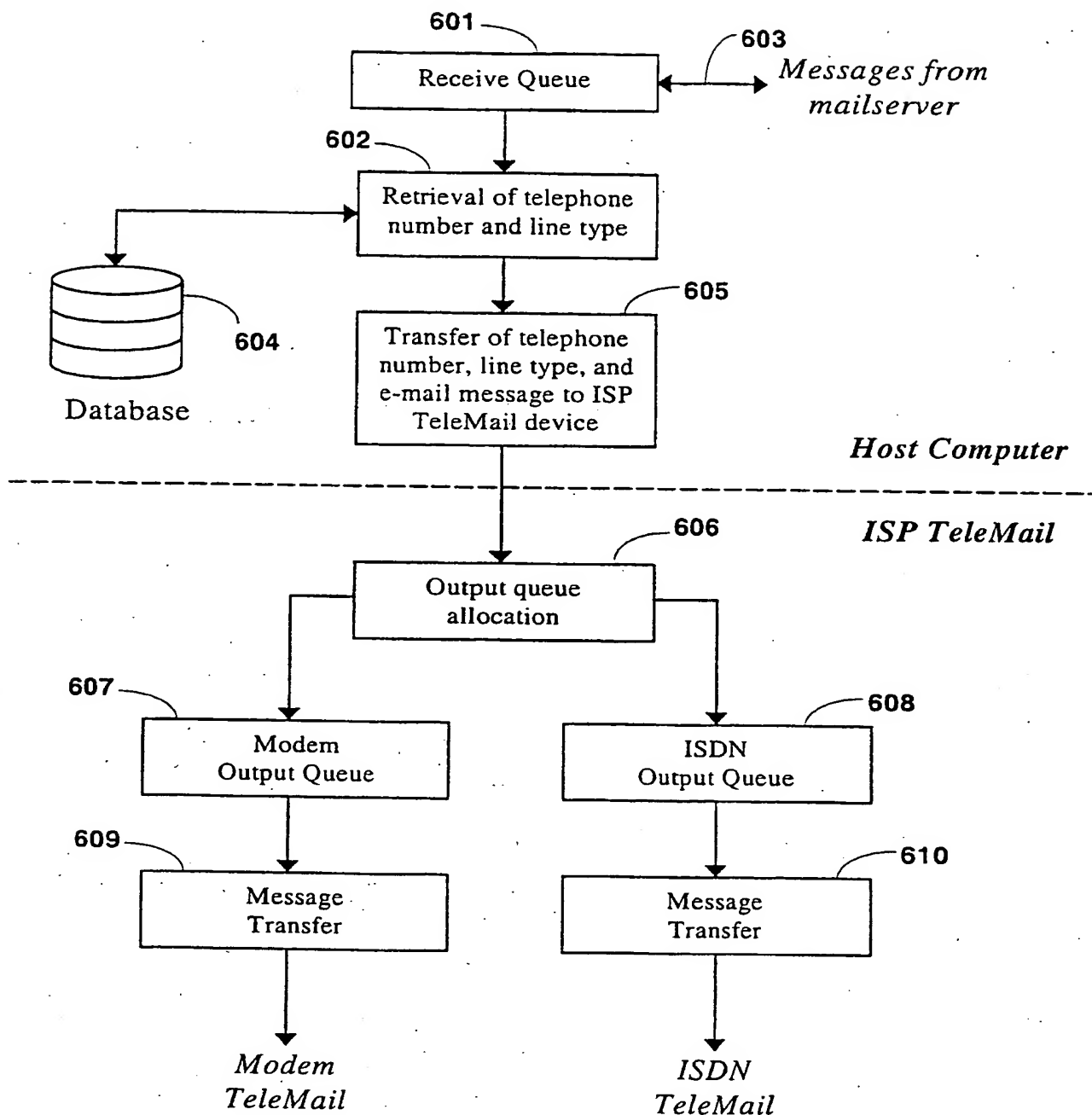


Figure 1F



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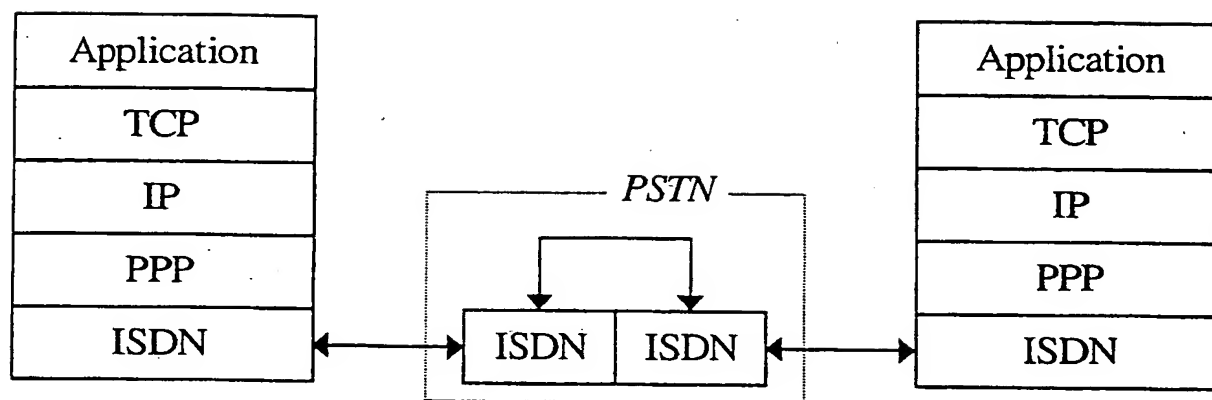


Figure 1G



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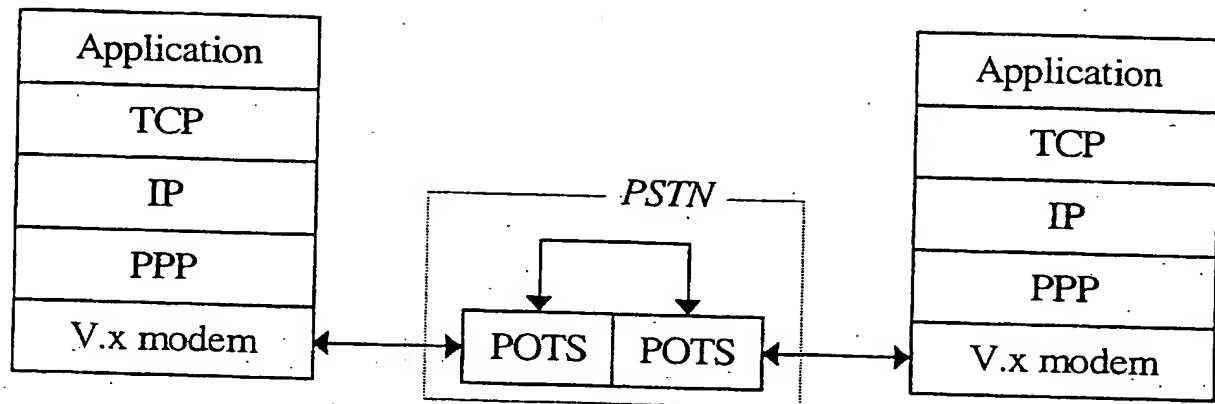


Figure 1H

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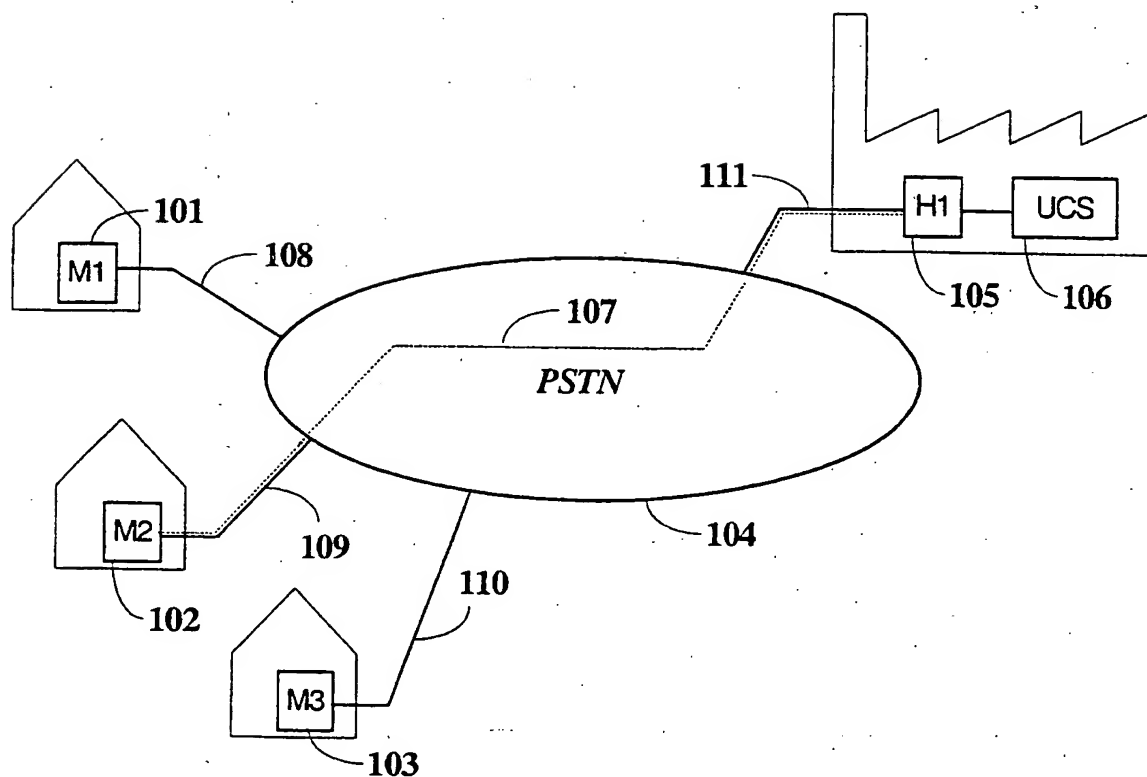


Figure 2A

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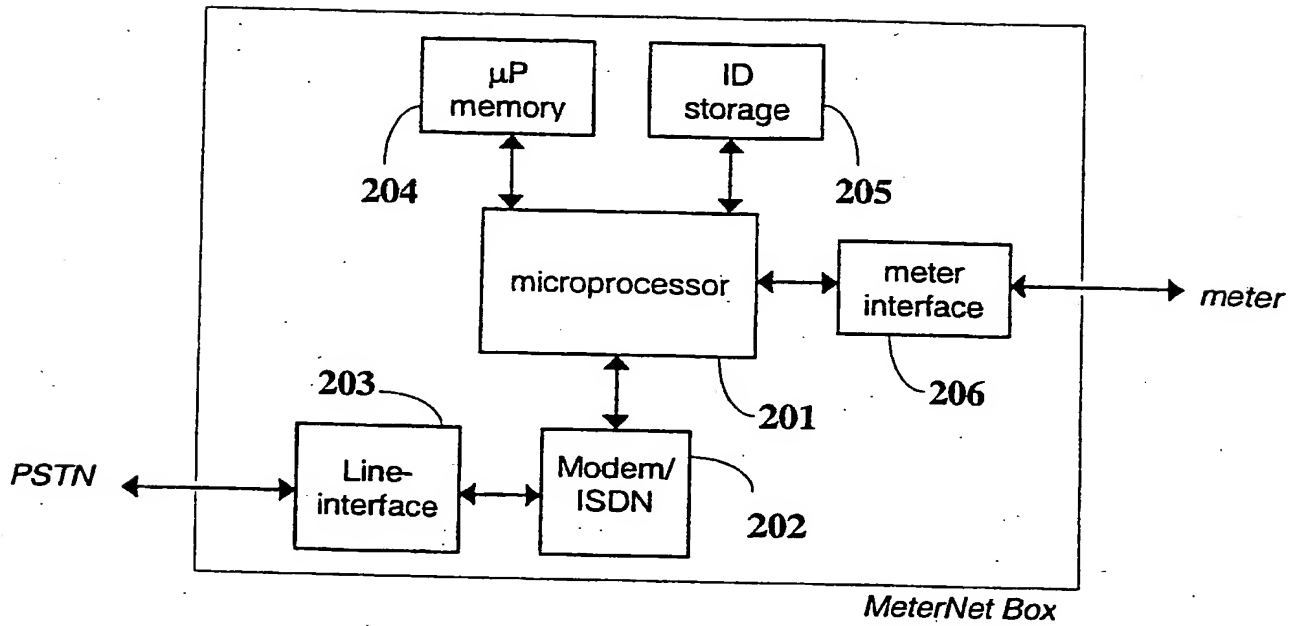


Figure 2B

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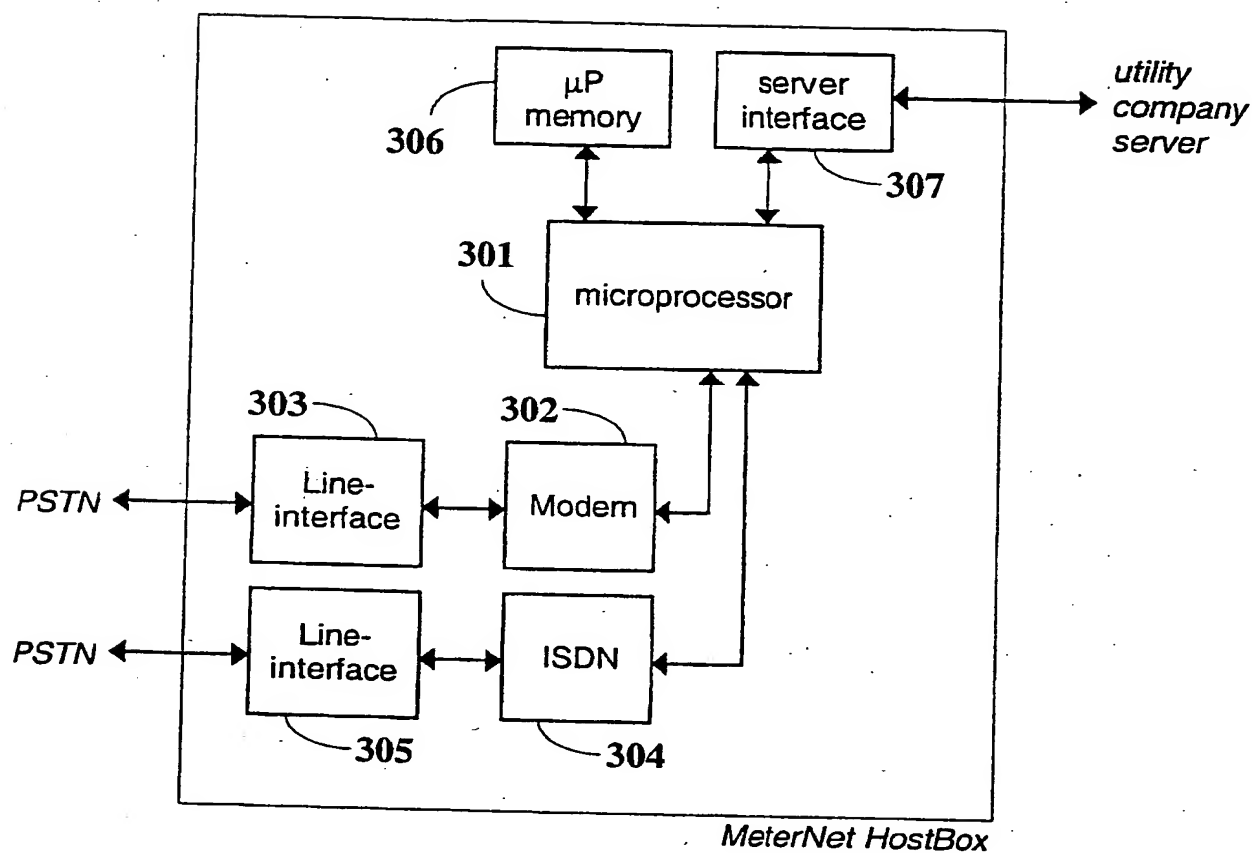
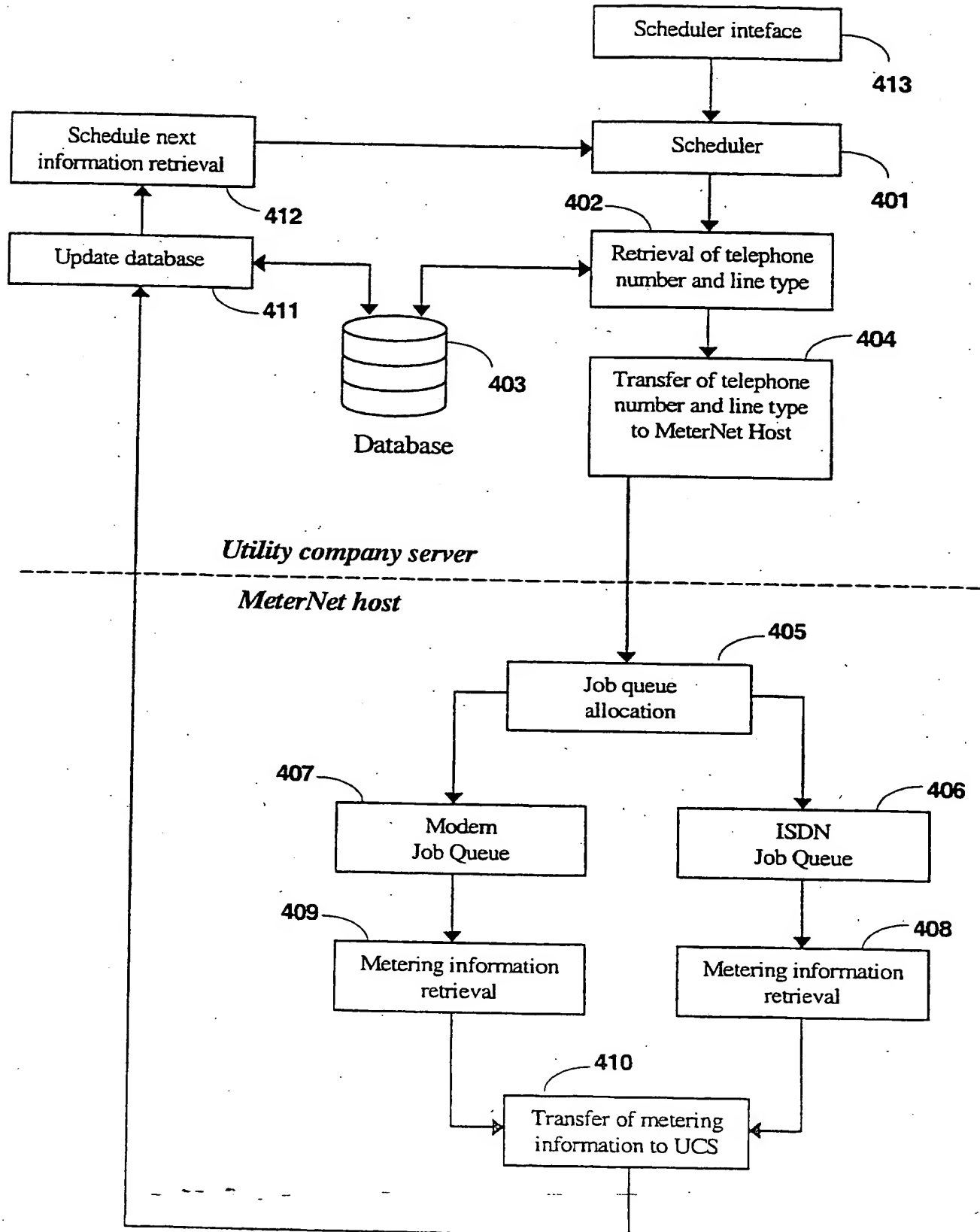


Figure 2C



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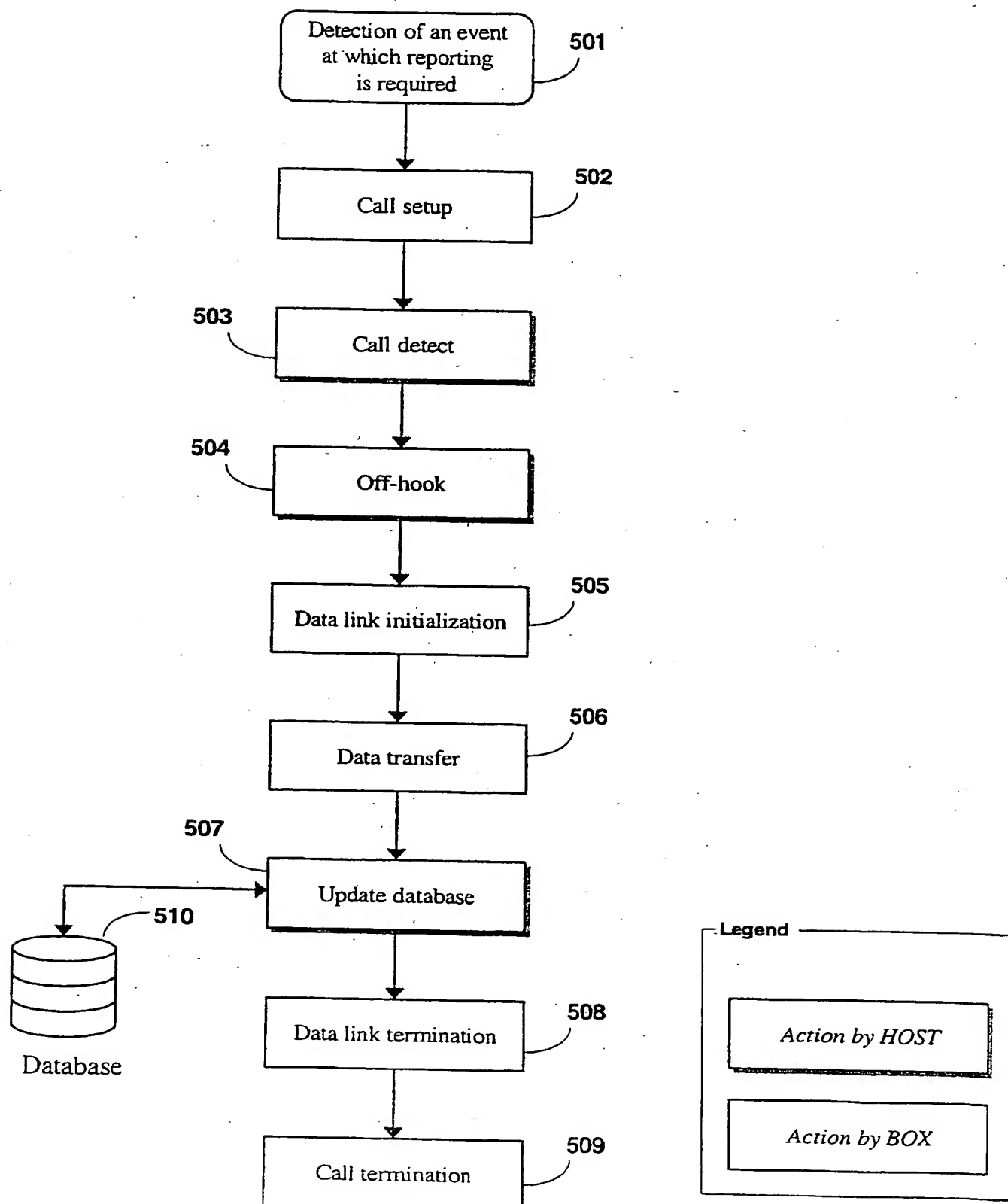
Figure 2D





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Figure 2E





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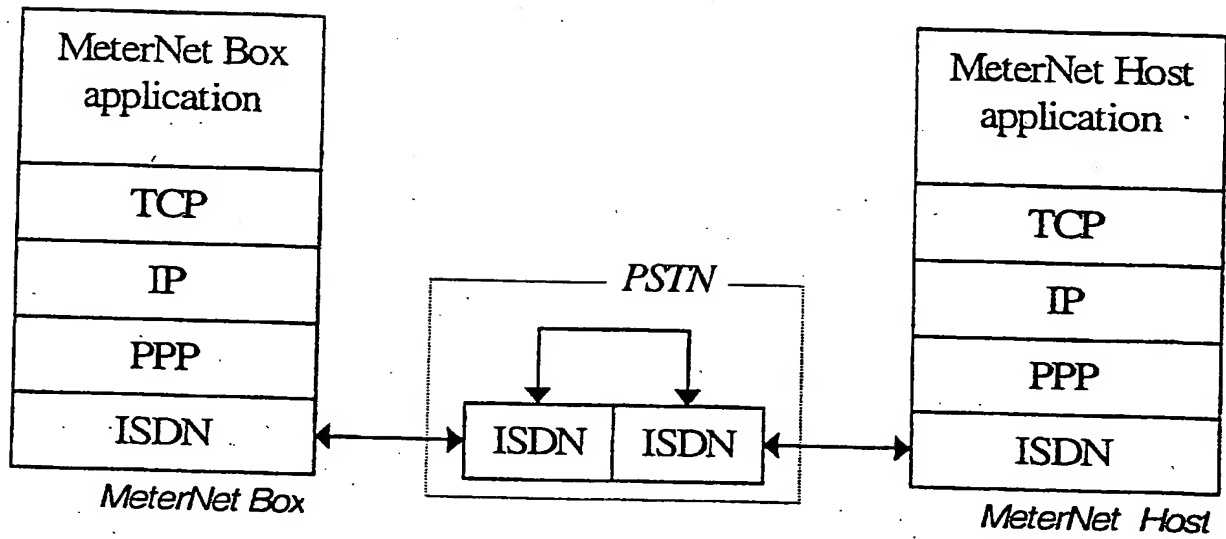
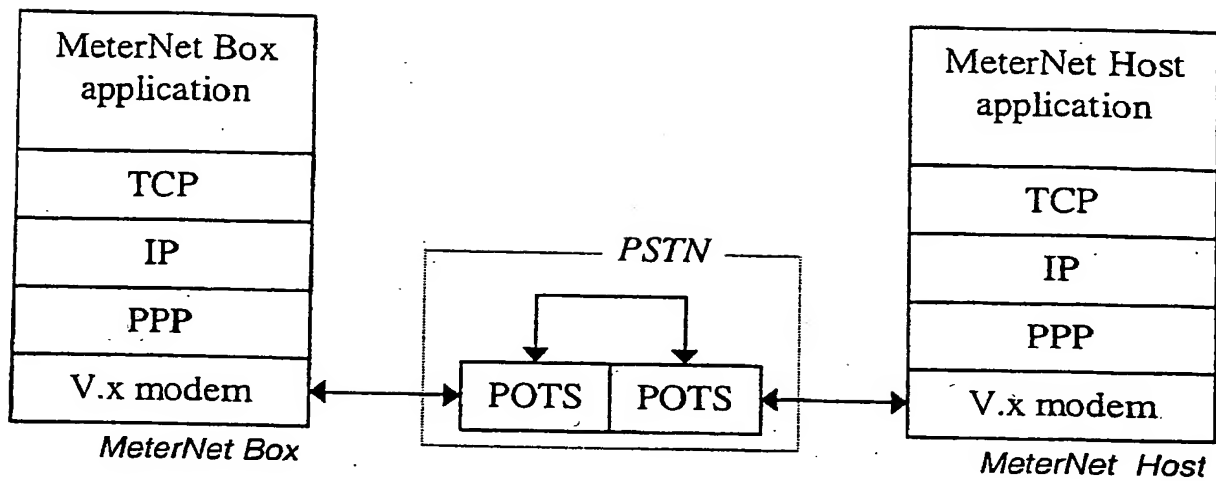


Figure 2F

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**Figure 2G**



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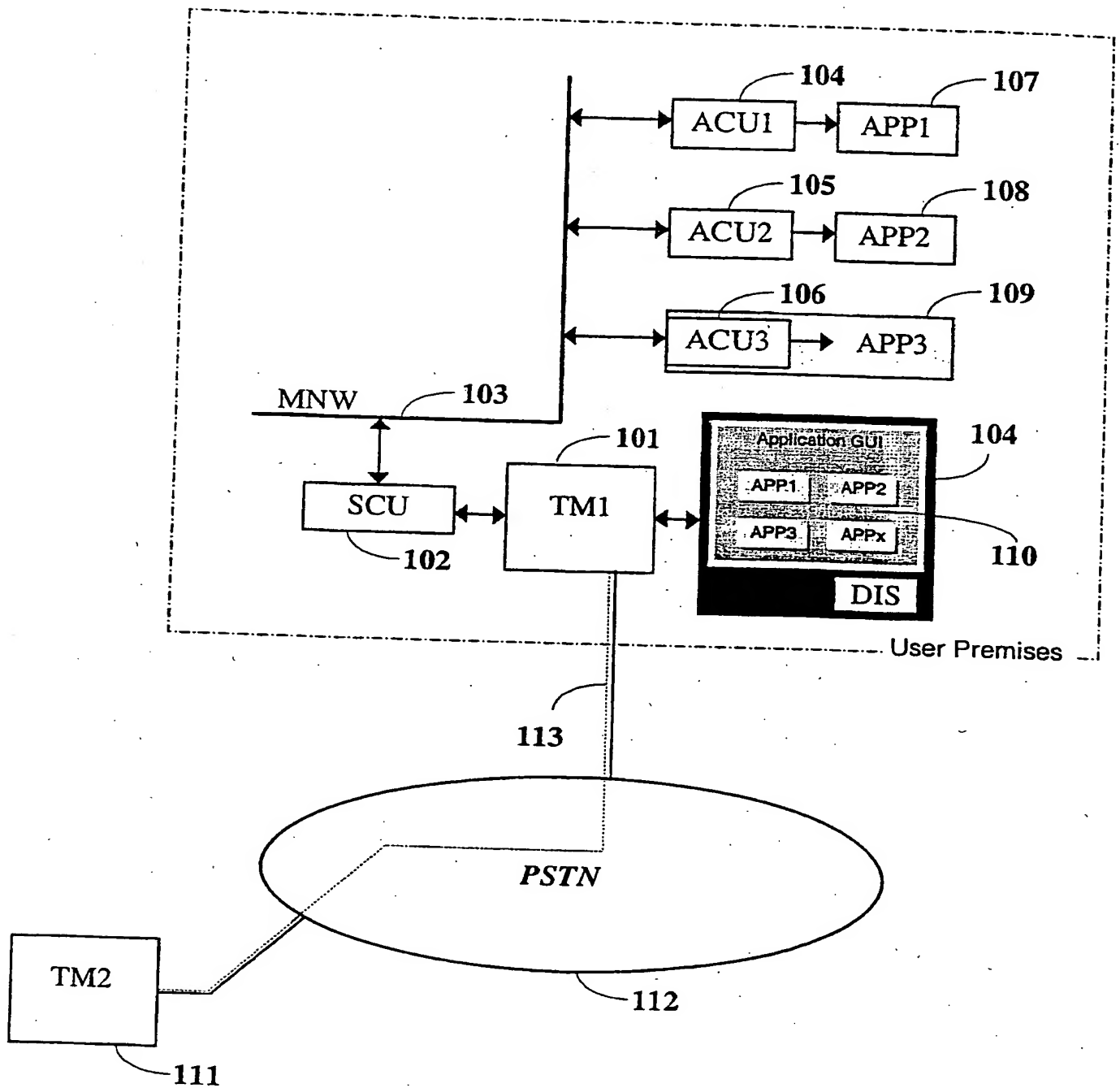


Figure 3A

From the INTERNATIONAL BUREAU

PCT**NOTIFICATION OF ELECTION**

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 05 June 2001 (05.06.01)	
International application No. PCT/EP00/08757	Applicant's or agent's file reference VDM-001-PCT
International filing date (day/month/year) 08 September 2000 (08.09.00)	Priority date (day/month/year) 08 September 1999 (08.09.99)
Applicant VAN DALEN, Pieter, Adriaan	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:30 March 2001 (30.03.01)☐ in a notice effecting later election filed with the International Bureau on:

2. The election
- ☒
- was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Olivia TEFY
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

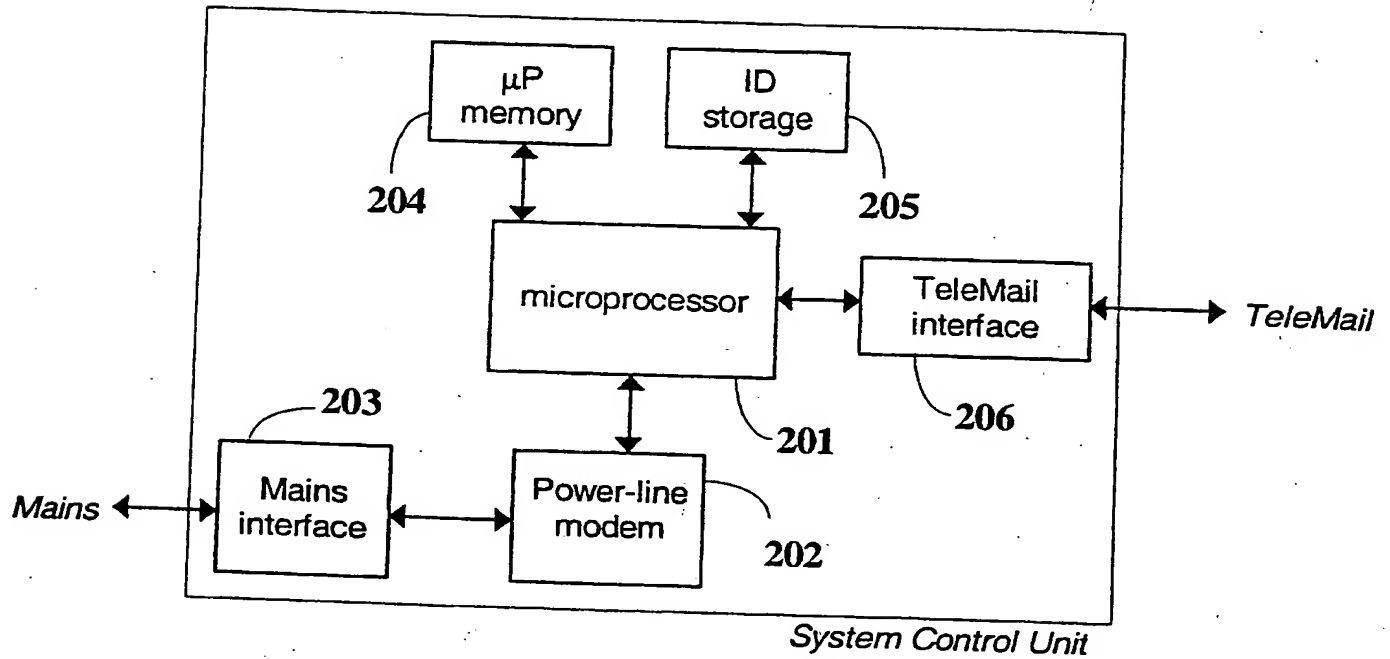


Figure 3B

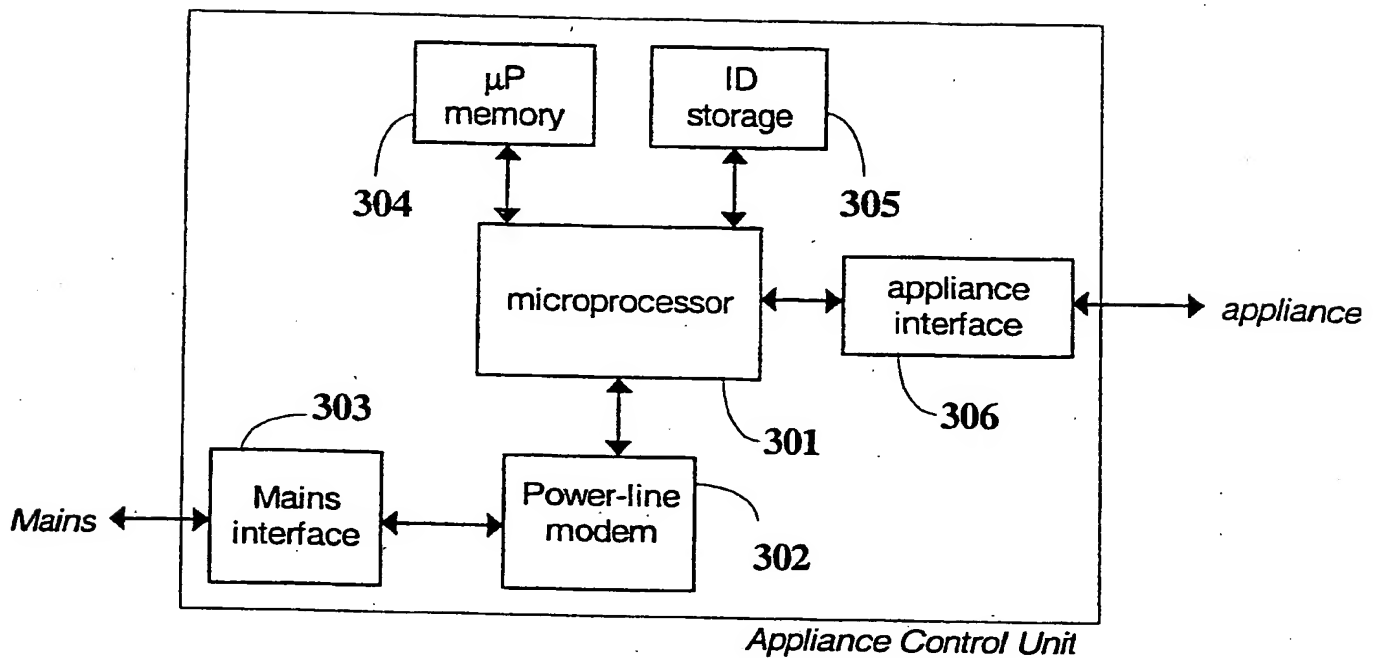


Figure 3C

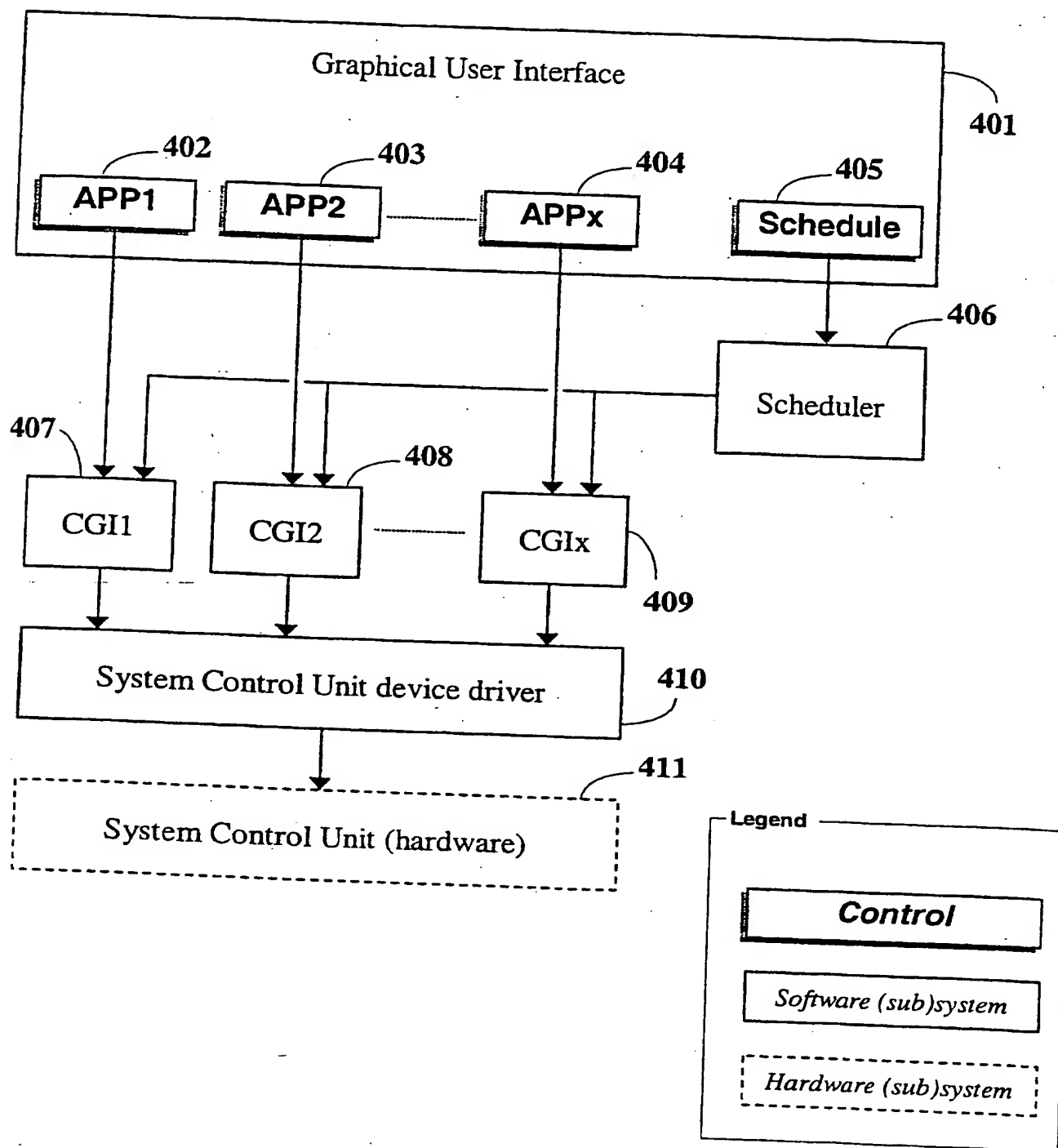


Figure 3D



CLAIMS

1. A method for establishing e-mail communication between two users/devices who/which both have access to the Public Switched Telephone Network, without the need of being connected to the Internet, comprising the steps of:

A) establishing the data link, and PPP connection between the sender and receiver application; and

B) transferring the e-mail message(s) to the receiver device over TCP/IP.

2. A method according to claim 1, further comprising the steps of:

C) composing one or more electronic mail messages through a Graphical User Interface application;

D) setting up a telephone connection to receiver device;

E) acceptance of the call by the receiver device;

F) storage of the e-mail message(s) on the receiver device;

G) termination of the data link and telephone connection;

H) perceptible (e.g. visual and/or audible) indication that an e-mail message has been received by the receiver application;

I) visual presentation of the e-mail message (including attached files) by the receiver Graphical User Interface application.

3. A method according to claim 1 or 2, further comprising the step of:

J) retrieving the telephone number of the receiver from a database;

4. A method of deriving an alias IP address from the telephone number, whereby the alias IP address is derived from a telephone number (including area and country codes) as follows:

- the decimal telephone number (including area and country codes) is converted to a hexadecimal identifier;

- the least significant four (4) bytes of the converted telephone number are used as alias IP address;

- if the converted telephone number has a length of less than 4 bytes, it is extended with leading zeros.

5. Method according to one of the previous claims 1-4, further comprising the step of forwarding an e-mail message from a mail server at the premises of an Internet Service Provider, to the receiver.

6. A stand-alone apparatus which is able to perform all the steps presented in one of the previous claims 1-5, both as receiver and sender.

7. Apparatus which is connected to a computer through an interface (e.g. RS-232), and which is independently able to perform the steps A, B, D, E, F and G in the previous claims 1-3, both as receiver and sender.

8. A Graphical User Interface application which interfaces with the apparatus presented in claim 7, and which performs the steps C, I and J presented in the previous claims 1-3.

9. Method of establishing communication according to claim 1 from a central host to devices at remote locations, all with access to the Public Switched Telephone Network (PSTN), in order to collect information from meters, comprising the steps of:

a) setting up a telephone connection from the central host to the device at the remote location;

b) acceptance of the call by the receiver device;

c) establishing the data link, and PPP connection between the sender and receiver application;

d) transfer the information to the host device over TCP/IP;

e) Termination of the data link and telephone call;

f) updating of the database by the host with the received information.

10. Method of establishing communication according to claim 1 to a central host by devices at remote locations, all with access to the Public Switched Telephone Network (PSTN), in order to transfer information from meters to the central host, comprising the steps of:

a) setting up a telephone connection to the central host by the device at the remote location;

b) acceptance of the call by the host device;

c) establishing the data link, and PPP connection between the sender and receiver application;

d) transfer the information to the host device over TCP/IP;

e) termination of the data link and telephone call;

f) updating of the database by the host with the received information;

11. Stand-alone apparatus to be installed at the remote location which is able to perform all the applicable steps presented in claims 9 and 10, both as receiver and sender.

12. Host apparatus to be installed at the central site which is able to perform all the applicable steps presented in claims 9 and 10, both as receiver and sender.

13. Method of using an arbitrary 32-bit identifier as alias IP address for the purpose of TCP/IP communication.

14. Method according to claim 1 of providing home automation network functionality as a TeleMail-based application, comprising the steps of:

5 a) connecting a System Control Unit to the TeleMail device, and to the in-house mains network;

b) inserting Appliance Control Units between the controlled appliances, and to the in-house mains network;

c) installation and configuration of the TeleControl application on the TeleMail device;

10 d) invocation of the TeleControl Graphical User Interface program;

e) activation of controls in the Graphical User Interface, which are directly related to an addressable appliance;

f) invocation of a Common Gateway Interface (CGI) process on the TeleMail device, to transfer an instruction to the addressed appliance through System Control Unit, and the mains network, to the Appliance Control Unit;

15 g) reception and evaluation of the instruction by the Appliance Control Unit;

h) execution of the instruction by the Appliance Control Unit;

i) closing of the TeleControl Graphical User Interface program;

20 15. Method according to claim 1 of automating the control over Appliances addressed by the TeleControl application, and connected to the mains network by means of a Scheduler as integrated function of the Graphical User Interface application, comprising the steps of:

a) invocation of the TeleControl Graphical User Interface program;

b) activation of the Scheduler control in the TeleControl Graphical User Interface program;

c) invocation and presentation of the Scheduler Graphical User Interface;

25 d) configuration of the Scheduler;

e) scheduling of actions at user-definable moments, and at user-definable fixed or irregular intervals;

f) closing of the Scheduler Graphical User Interface;

g) closing of the TeleControl Graphical User Interface program;

30 h) independent background execution of the scheduled actions by the Scheduler function, as described in steps F) through H) of claim 1.

16. Stand-alone or TeleMail-integrated System Control Unit to be connected to the TeleMail device, and to the mains network, which is able to perform all the applicable steps presented in claims 14 and 15.

5 17. Stand-alone or appliance-integrated Appliance Control Unit to be connected to the addressed appliance, and to the mains network, which is able to perform all the applicable steps presented in claims 14 and 15.

18. Method according to claims 14 – 17 comprising a unique System Control Unit identifier, and an assignable Appliance Control Unit identifier to uniquely qualify a home automation network, and the member Appliance Control Units connected to it.

10 19. Method of combining a unique System Control Unit identifier, and an assignable Appliance Control Unit identifier to uniquely qualify a home automation network, and the member Appliance Control Units connected to it.